“COMPARATIVE STUDY OF PRIMARY SUTURING VERSUS V-Y ADVANCEMENT FLAP TECHNIQUE IN RESURFACING POST EXCISIONAL DEFECT IN CASES WITH PILONIDOL SINUS DISEASE”

DISSERTATION SUBMITTED FOR

BRANCH – I
[GENERAL SURGERY]

MAY 2019

THE TAMILNADU Dr. MGR MEDICAL UNIVERSITY
CHENNAI
TAMILNADU

BONAFIDE CERTIFICATE

This is to certify that the dissertation entitled **"COMPARATIVE STUDY OF PRIMARY SUTURING VERSUS V-Y ADVANCEMENT FLAP TECHNIQUE IN RESURFACING POST EXCISIONAL DEFECT IN CASES WITH PILONIDOL SINUS DISEASE"** is the bonafide work of Dr. BUVANA.M in partial fulfilment of the university regulations by Tamil Nadu DR. M.G.R. Medical University, Chennai, for M.S (Branch I) General Surgery examination to be held in MAY 2019.

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BONAFIDE CERTIFICATE

This is to certify that the dissertation entitled "**COMPARATIVE STUDY OF PRIMARY SUTURING VS V-Y ADVANCEMENT FLAP TECHNIQUE IN RESURFACING POST EXCISIONAL DEFECT IN CASES WITH PILONIDAL SINUS DISEASE**" submitted by **Dr.M.BUVANA** , to The TamilNadu Dr. M.G.R. Medical University, Chennai in partial fulfillment of the requirement for the award of M.S. Degree Branch I (General Surgery), is a bonafide research work carried out by her under my direct supervision & guidance.

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Professor & Head of the Department,

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CERTIFICATE BY THE DEAN

This is to certify that the dissertation entitled **"COMPARATIVE STUDY OF PRIMARY SUTURING VS V-Y ADVANCEMENT FLAP TECHNIQUE IN RESURFACING POST EXCISIONAL DEFECT IN CASES WITH PILONIDAL SINUS DISEASE** is a bonafide research work done by **Dr.M.BUVANA**, Post Graduate Student, Department of General Surgery, Madurai Medical College and Government Rajaji Hospital, Madurai, under the guidance and supervision of Prof. Dr.S.R.DHAMODHARAN M.S.,FIAGES., Professor and Head of Department of General Surgery, Madurai Medical College and Government Rajaji Hospital, Madurai.

Dr.D.MARUTHUPANDIAN, MS FICS FAIS
Dean
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DECLARATION

I, **Dr. M. BUVANA** declare that, I carried out this work on **"COMPARATIVE STUDY OF PRIMARY SUTURING VS V-Y ADVANCEMENT FLAP TECHNIQUE IN RESURFACING POST EXCISIONAL DEFECT IN CASES WITH PILONIDAL SINUS DISEASE** in the Department of General Surgery, Govt. Rajaji Hospital . I also declare that this bonafide work or a part of this work was not submitted by me or any others for any award, degree and diploma to any other University, Board either in India or abroad.

This is submitted to The TamilNadu Dr.M.G.R.Medical University, Chennai in partial fulfillment of the rules and regulations for the M.S. degree examination in General Surgery.

Place: Madurai
Date: **Dr. M.BUVANA**

ACKNOWLEDGEMENT

At the outset, I wish to thank our Dean **Prof. Dr. D. MARUTHU PANDIAN**, MS. FICS.FAIS, for permitting me to use the facilities of Madurai Medical College and Government Rajaji Hospital to conduct this study.

I sincerely thank my unit **Chief. PROF .DR.A.M.SYED IBRAHIM M.S FAIS.**

I express my immense pleasure of gratitude to my Head,Dept.of general surgery **PROF.DR.S.R.DHAMOTHARAN M.S., FIAGES**.,For his guidance, inspiration during my degree course.

I offer my heartfelt thanks to my unit Assistant Professors: **Dr. M. LAKSHMI NARAYANAN M.S Dr. R. JANAKI RAMAN M.S, Dr. M. SUMATHY M.S., Dr. KUNDHAVI. P M.S DGO,** for their constant encouragement, timely help and critical suggestions throughout the study.

My patients, who form the most integral part of the work, were always kind and cooperative. I pray to God give them courage and strength to endure their illness, hope all of them go into complete remission

Above all, I am thankful to The Almighty for the support throughout this study.

Place: Madurai

Date: **Dr. M.BUVANA**

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INTRODUCTION

Pilonidal sinus disease was reported before 150 yrs. pilonidal disease incidence is 27 / 100,000 population. males preponderance is common, at a ratio of about 5:1. Seen in early twenties, decreasing in incidence after age 25 and after age 45 it is very rare.

Initially pilonidal sinus was considered of congenital origin than acquired disease.. it is considered as minor disease ‘ developed multiple theories based on etiology .. it was named as jeep rider disease.

, multiple treatments has been identified for pilonidal disease but no protocol has been designed, and studies emerged by comparing treatment cost, morbitiy, and return to work state. After 1965 multiple modalities arrived ,among them are curettage the tracte/brushing with excision follicle opening , injection of phenol into the tract , pilonidal pit was cauterised , pilonidal sinus excision and lay open and allowed to heal by granulation , excision up to sacrum and either primary suturing or skin flaps . Asymmetric closure seems excellent as it has speedy recovery and minimal recurrence rate, low inconvenience to the patient, and early return to work.

The primary aim of advancement flap is to transfer the scar tension that obtained from side-to-side closure to good cosmetical closure from flap.. For putting the flap, we need to know its dynamics. First step is

movement of flap into the defect created by excision of pilonidal sinus. flap movement demonstrates secondary defect. primary purpose of flap is to closing the primary defect, while reducing secondary defect size.

PILONIDAL SINUS PILONIDAL ABSCESS

OBJECTIVES

To compare the rate of occurrence and nature of complications in **COMPARATIVE *STUDY OF PRIMARY SUTURING VS V-Y ADVANCEMENT FLAP TECHNIQUE IN RESURFACING POST EXCISIONAL DEFECT IN CASES WITH PILONIDAL SINUS DISEAS***

REVIEW OF LITERATURE

HERBERT MAYO DESCRIBED IT AS A SINUS CONTAINING HAIR FOLLICLES LOCATED IN THE SACROCOCCYGEAL REGION IN 1833.

In 1847 it was refined by Anderson.. in 1854 Warren find out pilonidal abscess which hair in region of natal cleft. Hodge coined term pilonidal, it's a Latin word pilus means hair and nidus means nest. Pilonidal sinus means hair nest, sinus lined by squamous epithelium contain hair

EMBRYOLOGY

The notochord is invaginated into a position just ventral to the neural tube (endodermal origin The mesothelium forms the sclerotome which form the vertebra. At the same time the notocord degenerates and disappears. The vertebra fuses in a cranio-caudal fasion over the dorsum of the neural tube extending to the tip of the coccyx and is attached there with the filum terminale even in adults The medullary canal then starts fusing at the coccyx and extends cranially and caudally Mallory examined 6 fetuses finding a epIthelial lined canal at or near the coccyx, sometimes communicating or near the skin without any hair follicles The conclusion then is that the non closure of the medullary canal is the source of the pilonidal sinus, and excision of the coccyx is advocated in recurrent cases – canal present in the embryo is partly obliterated in the post anal region leaving a pit opening onto the skin. post anal dermoid ,post anal dimple ,congenital dermoid sinus ,sacrococcygeal dermoid conditions do not contain hair whereas pilonidal sinus contains hair-- TURELL AND GLADSTONE 1951 presence of hair proves probability that no developmental basis exists for formation of true pilonidal sinus NOVEL THEORY-PATEY &SCARFF{1946} KING{1947}pilonidal sinus is acquired condition –penetration of loose hairs from exterior into subcutaneous tissue

- No embryological origin distinguish from dermoid inclusion cysts
- Very rarely Sinuses to neural canal can extend to the dura, seen in the lumbar region
- At puberty pilosebaceous glands are stimulated and the hair follicle is distended by keratin and develops secondary folliculitis
- Traumatic injury in mid line, friction, obesity and poor hygiene contribute to the problem.
- Infection and softening of the skin.
- This causes a pilonidal abscess, rupturing to the subcutaneous tissue, forming a sinus tract becoming secondarily epithelialized with cuboidal epithelium.
- Hair then is able to gain access to the sinus
- This the cause a foreign body reaction with suppuration and secondary sinus formation

RELATED ANATOMY

Pilonidal disease occur in many regions of the body, mainly in the sacrococcygeal region of the gluteal cleft about 4 to 5 cm above the anal orifice. pilonidal sinus commonly appeared as chronic discharging sinus usually in sacro-coccygeal region in midline gluteal cleft moreover the patient might have multiple openings in the centre or lateral secondary openings adjacent or above to midline pit. squamous epithelium lines pilonidal sinus tract .and sinus tract extends upto subcutaneous plane which was coated by granulation tissue and filled with bunch of hair. abscess formation situated in midplane or lateral to the midplane. sacro-coccygeal region is commonest in gluteal cleft but the extra natal regions are webs of fingers seen in barbers, hair dressers, milkers, slaughter houses and also in perineum,axilla, chest wall, umbilicus, ear, amputation stump, suprapubic region.

WEB SPACE IN THE HAND SHOWING PILONIDAL SINUS

Dimple of the skin is commonest finding in post anal region.

INCIDENCE

It is usually seen in their late teens and young adults, the maximum incidence being between 19 and 25 years of age. There is a 4:1 male predominance. It is most common in Caucasians due to differing hair characteristics and growth pattern, and in men with excessive amounts of hair. living in hot countries, very common in hirsute indivualss The incidence of pilonidal disease is depends on age, ethnicity and gender.

AETIOLOGY

Although various theories have been established no consensus has been reached. According to the supporters of congenital theory, pilonidal sinus disease occurs because of residual epithelium in the spinal canal and skin or when hair follicles enter to interspace formed by incomplete fusion occurring as a result of a defective union of the skin layer during the early embryonic period. entrapment of hair follicles and epithelium in region of sacro-coccygeal area is another theory.., which was accepted universally.

Texticity of matters for pilonidal disease occurance- thick, curly and profuse growth.

They are

- Two buttocks friction
- wide intergluteal depth
- body mass index
- hairy rate
- genetic predisposition
- Local injury
- Tissue papers for cleaning the perineum
- poor personal hygiene
- prolonged sitting and increased sweating
- Obesity

- ❖ Family history of pilonidal disease
- ❖ Taxe driver ,furuncle nd folliculitis in natal region.

PATHOPHYSIOLOGY

Many Theories Deviced for Many Years.

CONGENITAL THEORY

Congenital theory says pilonidal sinus disease was origin by birth and found factors in human embryo itself.

Persistence of a caudal remnant of the neural canal that remained adherent to the cutaneous surface,forming small cysts which later rupture causing blind-ended sinuses.

Cystic changes of sequestrated epithelial nests, leading on to the formation of dermal inclusions. dermoid tractions created during involution of human tail bud preen gland-like structures (phylogenetic representation in some birds) found in sacrococcygeal region empty through a duct in posterior region were thought to be special down growths of epithelium originating from the skin.

ACQUIRED THEORY

Congenital theory was objected by scarf and patey, and t was accepted by Hueston, Davage. curie, Gibson, goodall. no one demonstrated by microscopy that follicles belong to hairs growing skin surface. dead hairs and unattached loose hairs seen n d tract and pointed end of hair s facing lumen of sinus .inter digital sinus have no embryological history and explanation justifying it.

Opposing factors against congenital theory are

The presence of developmental abnormalities simiar to those in sacrococcygeal region in the cervical and dorsal region of the vertebral column unaccompanied by pilonidal sinus the presence of the entity in males more than female while in congenital aspects as equal ratio as expected. Presenting only in adolescent age groups the linkage between pilonidal sinus and occupation eg jeep driver soldiers, barbers hand.

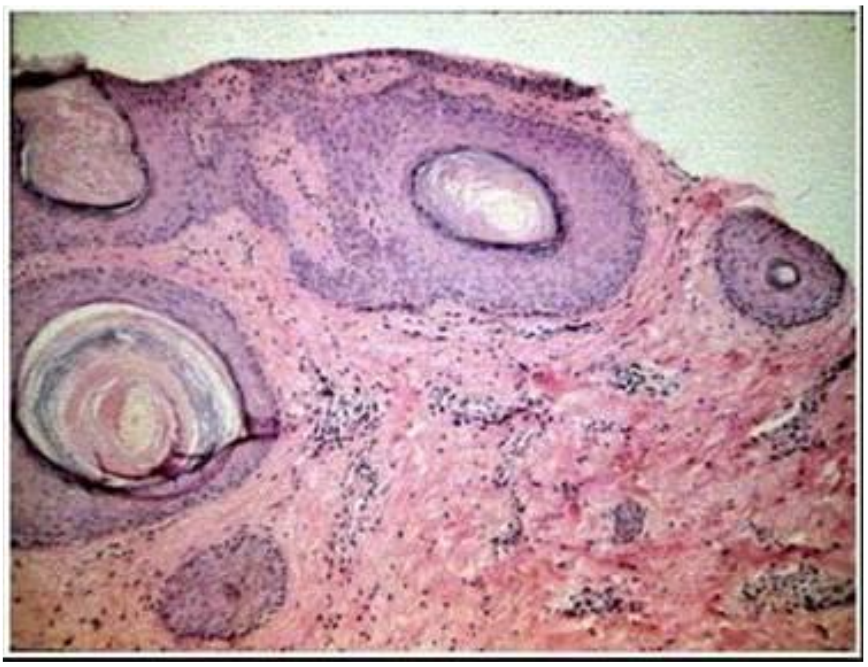
Role of hair in the sinuses

1. Free hairs invading sinuses provokes reaction like a foreign body
2. Hair act as mechanical hindrance interferes .healing.

Karyadakis Theory Follows.

- ❖ The invader was loose hairs
- ❖ Insertional force
- ❖ Narrow intra natal cleft favouring hair insertion

MICROSCOPY



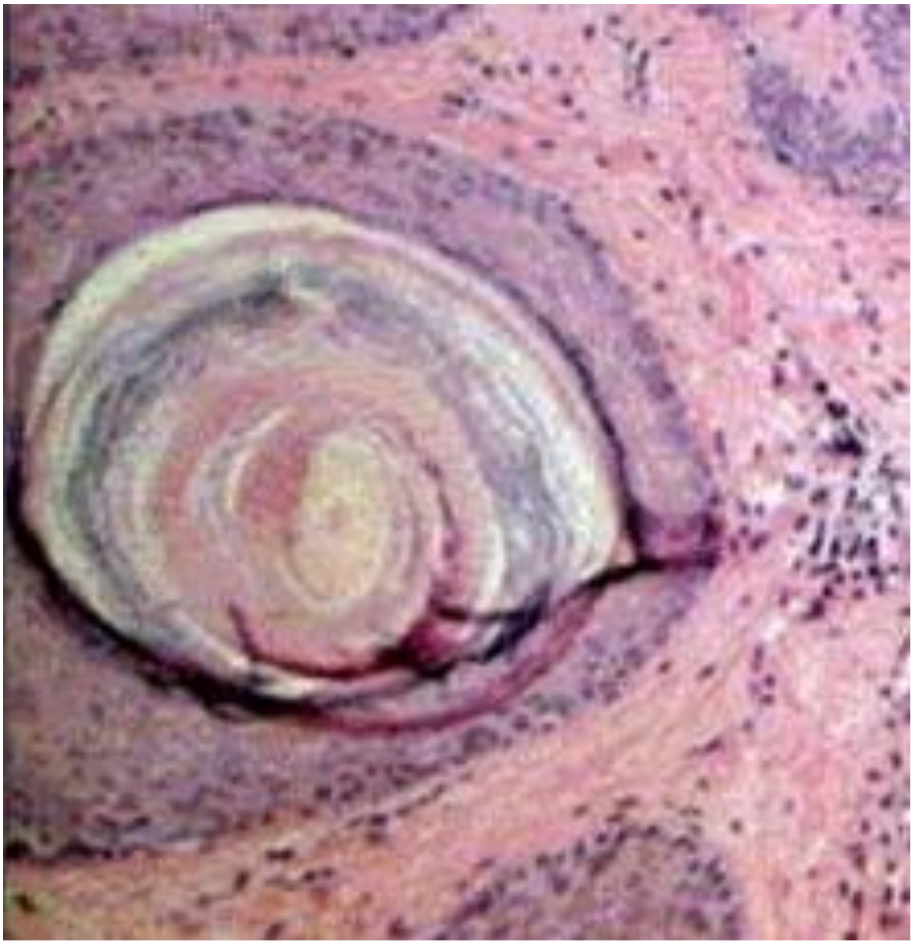
Microscopy revealed,

1) Different types of hair follicles: Normal, Moderate, and extremely distended hair follicles which are seen together in the pits.
2) Hair is surrounded by keratin sleeves arranged in concentric layers
3) Germinal hair bud is seen in the walls of the pit.

Distorted hair follicles have midline pits**MECHANISM**

Two kinds of forces play a role in enlargement of hair follicle. Accumulated keratin producing outward force.Vacuum producing inward force.

ACCUMULATED KERATIN



Keratin accumulation

PILONIDAL DISEASE STAGING AND ITS MICROSCOPY:

Infection leads to edema and mouth of the follicle becomes closed. Infection being hairs and the keratin plugs which does not allow the contents to be let out.Wall of the abscess contain shaft the hair which

heals. There will be a hole in the epidermis through which hair penetrates inside and outside the body.

Accumulated keratin plays an outward force and vacuum created an inward pulling force. Together these forces pushes the pus towards the fat resulting in the formation of acute pilonidal abscess. Drainage of which leads to reduction of the edema. Bascom and Karyadakas described the pathogenesis of pilonidal sinus excellently

THE REASON FOR MORE COMMON INVOLVEMENT OF MIDLINE:

Hairs, skin cells, barbs in hair cluster together in midline regions produces a friction during walking which gets sucked in due to vacuum and form midline pits.

MANAGEMENT:

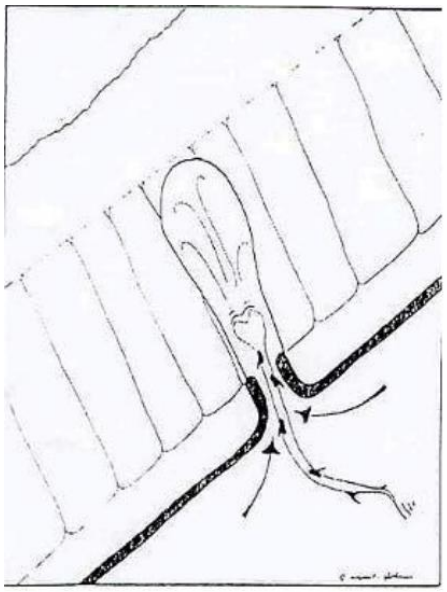
- Pilonidal sinus managemaent based on
- Stages and its presentation nature

MECHANISM

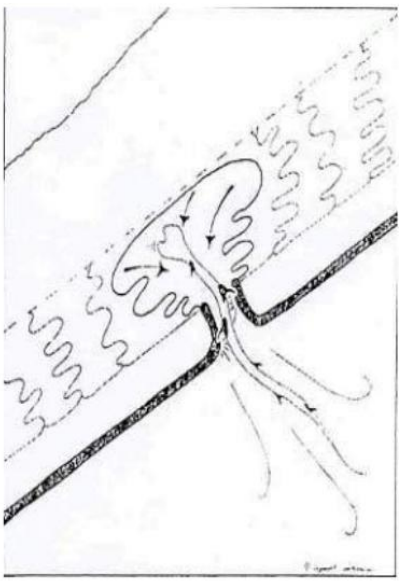
While standing, Gluteal tissue separated apart from the sacrum due to gravity and the vaccum will be created which makes the air to sucking into pit along with tuft of hairs in the gluteal cleft.

While sitting the gluteal tissue pushed against the sacrum which seals the exit of sinus along with buttocks joining together creates the vacuum which was explained by breaerly.

In order to drain the pus we have to create a pressure of 125 mm of mercury which was not attained during sitting and hence pus finds different tunnels to form absceess in a distant site from the hair follicle



Standing



Sitting

HORMONAL THEORY

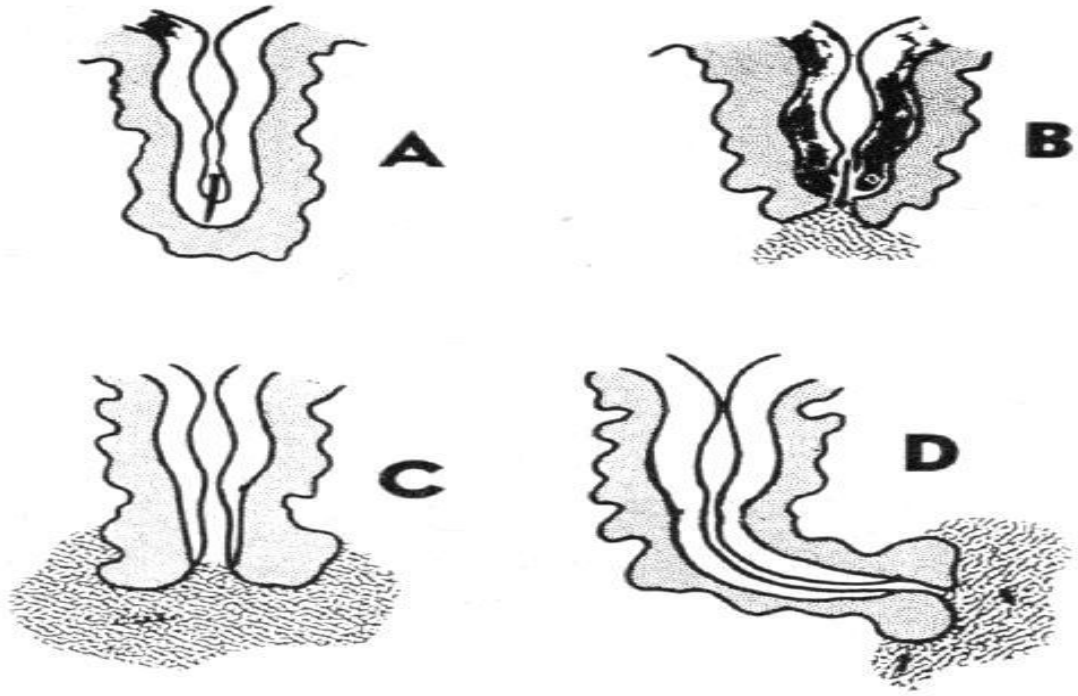
In Pubertal age, sex hormone plays a role in growth of the pilosebaceous glands, and the hair follicle formation along with keratin which leads to folliculitis, edema and occlusion of follicles. Infected follicle ruptured into the subcutaneous tissue and thereby forming abscess leads to sinus tract.

In 90% of patients hair follicles have sinus tract proximally about 5 to 8 cm from the anus.In 10% of cases SINUS TRACT located caudally 5 to 8 cm from the anus.

Pathology behind the pilonidal sinus is hair initiate the foreign body reaction into which loose hair sucked in during sitting and standing because of friction and movement of the buttocks.

PATHOANATOMY;

POST ANAL region shows dimple of the skin mostly. Anatomically dimples are nothing but dense collagenous fixation of skin to bone and fascia.



A - loose hair in the anal dimple penetrate epidermis with its pointed end.

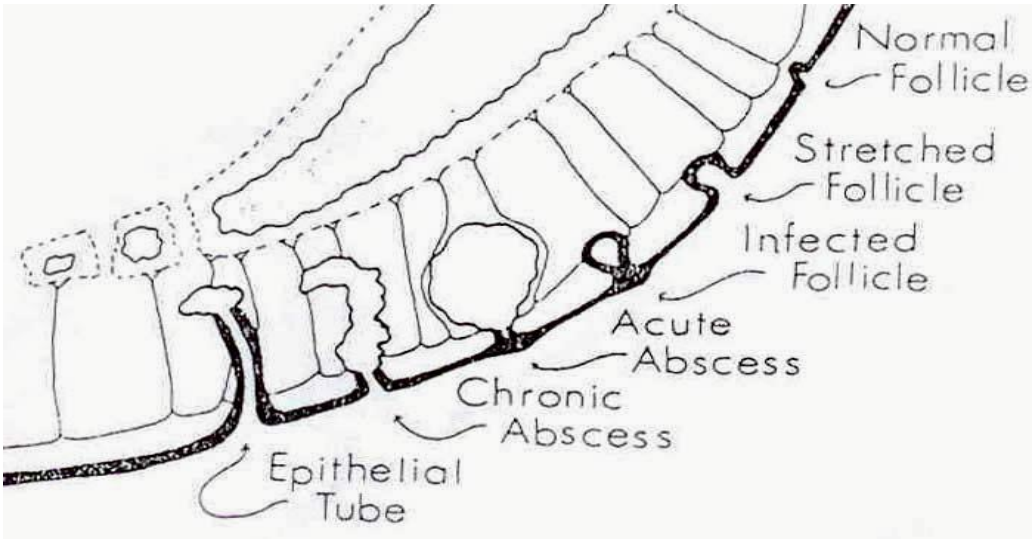
B and C - Shows inflammatory reaction to foreign body -hair

D – tract epithelisation

triad of post anal dimple, loose bits of hair and fecal residue leads to pilonidal abscess. Persistence of infection is due to intranatal cleft anatomy, which favouring collagen to get attach skin to periosteum of the coccyx and sacrum helping in wide spread of infection.central portion contains plenty of fatty tissues in d surrounding fibrous

tissue,due to disease process ratio of fat to collagen reversal happens, fatty tissue dispersed within thin fibrous bands.high rate of recurrence due to pseudopod extension of fibrous tissue in the region of fat tissue.

PILONIDAL DISEASE - STAGES



I - Normal follicle.

II - Distended hair follicle filled with keratin.

III – Oedematous follicle obstructing the mouth which leads to infection resulting in collection of pus called Acute abscess.

IV – Chronic pilonidal abscess.

V – Epithelialization of the sinus tract

CLINICAL FEATURES

Pilonidal sinus presented with variety of clinical features - asymptomatic pits to chronic draining sinus tracts .Its most common among persons with abundant hairs .Though it occur in both gender it occurs earlier in females due to prematurity in the ratio of 5:1.

It ranges from asymptomatic pit in the gluteal cleft to recurrent or chronic discharging sinuses. They usually have a waxing and waning phase of discharging sinuses. Anaerobic bacteroides are most commonly found.

Rarely carcinomatous change occur in sinus with prolonged duration might be squamous cell or spinocellular variety which has worst prognosis.

Presenting Symptom:

Pain and purulent discharge is the common presentation .few presents with acute abscess .

DIAGNOSIS:

Deep indurated zone palpated in the sacro coccygeal region with the sinus opening proximally and rarely distal.

INFECTION

Anaerobes are more common among in reinfection .common anaerobes are Bacteroides and Enterococci . staphylococci and haemolytic streptococci among aerobes.

COMPLICATIONS

- Recurrence of abscess is common complication.
- Recurrence of pilonidal disease is the next.

TYPES OF RECURRENCES

Early recurrence – failed detection of sinuses during surgery

Late recurrence - secondary bacterial infection due to residual debris , poor wound care

Treatment of Squamous cell carcinoma is en bloc surgical resection followed by local RT and chemotherapy.

PROGNOSIS

It has very good prognosis except in squamous cell carcinoma .

DIFFERENTIAL DIAGNOSIS

FISTULA IN ANO

Fistula in ano and hidradenitis suppurativa are difficult to differentiate from pilonidal sinus. palpation of tract with secondary opening in the anus.

HIDRADENITIS SUPPURATIVA

A chronic inflammatory disease of the apocrine sweat glands in which folliculitis and local friction present, common in diabetes and obesity.

CONGENITAL ABNORMALITIES

(meningocoele), a continuous tract with the central cord of the spinal cord may occur, and discharge of CSF may be present

PERIRECTAL ABSCESS

Location of the lesion is differentiate this entity from pilonidal disease. Perirectal abscesses require emergency surgical consultation for formal drainage in the operating room.

- Primary presacral or sacro-coccygeal sinus
- Furuncle or carbuncle
- Pyoderma gangrenosum
- Pyoderma gangrenosum is an ulcerative lesion seen in with other co-morbidities.
- tuberculous granuloma
- syphilitic granuloma
- dermoid cyst & sebaceous cyst
- Osteomyelitis in sacral region with draining sinus

MANAGEMENT

Management of pilonidal sinus depends on the presentation of the disease. The common presentations of the pilonidal sinus are categorized into 3,

1. Acute pilonidal abscess,
2. Chronic pilonidal disease, and
3. Complex or recurrent pilonidal disease.

surgical management is based on above category . The goals of ideal procedure for treatment of this disease should be:

1. Better wound healing with low recurrence rate.
2. Hospital stay should be less
3. Patient convenienence
4. Complications and morbidity should be less.
5. Quick return to routine work

non-surgical and surgical modalities of treatment have been advocated in the management of Pilonidal Disease .

NON-SURGICAL

- Injection of sclerosing agent
  - Fibrin Glue
  - Cryo-surgery
  - Electro-cauterization
- Repeated shaving or use of depilation creams

SURGICAL

- Drainage with/without excision
- Marsupialization
- Excision with healing by secondary intention
- Excision with primary closure

To prevent recurrence rate and chronicity, other procedures

- Karydaki's flap
- Bascom procedure
- Modified Bascom procedure

Named technique of transposition flaps

- Z plasty
- V-Y fascio-cutaneous advancement flap
- Crossed Triangular Flaps
- Gluteus maximus musculo-cutaneous flap
- Rhomboid flap of Limberg

above techniques have low recurrence rate by reducing the depth of the natal cleft and place the suture line away from the midline natal cleft and with low tension at the suture lines.thus comparing flap techniques with primary suturing.

CONSERVATIVE TREATMENT

Conservative treatment needs longer period to achieve positive results.

They are

- Hair control by shaving the natal cleft
- Removal and scraping of the granulation tissue
- Laser depilation of the natal cleft hair
- Cleaning out the natal cleft and removing all hairs
- Frequent washing of the parts with detergent and water and with a solution containing equal parts of witch hazel and alcohol Avoidance of prolonged sitting

TREAT**MENT OF ACUTE EXACERBATION (ABSCESS)**

Pilonidal abscess is treated by incision and drainage, and curettage of the abscess cavity is to remove hair nests and skin debris.

under local anesthesia., make the drainage incision laterally, away from the midline, opened through a small incision. All hairs and granulation tissues removed as emergency procedure.

Wounds heal poorly in the deep intergluteal natal cleft, which allows frictional movement of one buttock over the other. The wound should be cleansed daily in sitz bath.

hygiene and hair shaving of the surrounding area to be to prevent hair from penetrating the healing scar. diseased area should continue for approximately 3 months, even after the wound has completely healed.

Wound heals completely in approximately 1 month. Incision and drainage, without curettage results in wound healing in approximately 60% of patients within 10 weeks. 40% develop a recurrent pilonidal sinus, requiring further treatment.

Drainage of the abscess is not a curative procedure ,because 85% of patients require further surgical treatment. Excising the pilonidal pit at the time of abscess drainage reduces the recurrence rate to 15%. pilonidal pit initially cannot be identified during the first drainage procedure of the abscess. After oedema is reduced, the pit can be identified. advice the patient to return 5-7days after abscess drainage to identify the pit and to excise it with a small incision is possible.

MEDICAL THERAPY

1. INJECTION OF SCLEROSING AGENT

Phenol injections are used for treatment of the pilonidal sinus . chronic pilonidal disease and acute pilonidal abscess (after drainage) may be managed by phenol injection.80% phenol is injected into the sinus, left there for 1minute, and then expressed out of the cavity.

Sinus is then curetted. again repeated as many as 3 times for a total of 3 minutes of phenol exposure at one treatment. treatments may be repeated every 4-6weeks as necessary as wound healing progresses. Paraffin jelly may be used to protect the skin from the phenol, which destroys the epithelium.

Phenol sterilizes the sinus tract and removes embedded hair. Phenol injections combined with local excision of the sinus. Wound healing usually requires 4-8weeks.

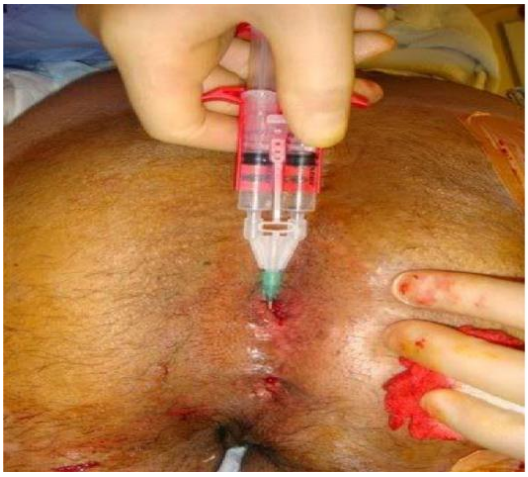
The incidence of recurrence is around 9–27%, which is identical to following simple excision and packing open the wound.due to intense local inflammatory response after the phenol injection, patient adviced stay in hospital overnight. patient adviced to take bath daily and keep the area shaved.

2 **FIBRIN GLUE**

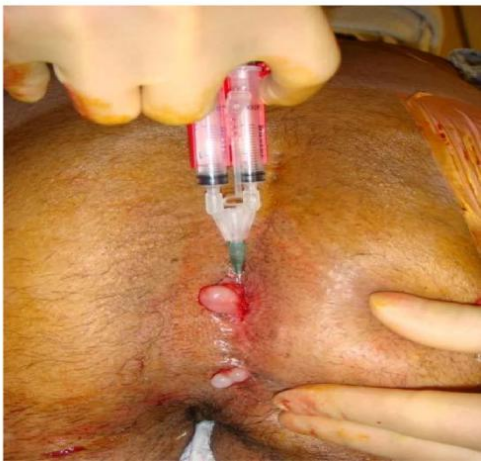
Curettage followed by injection of fibrin glue. Promising early results with improved pain scores and earlier return to normal daily activities

A-Delineating the sinus tracts

B-Curetting the sinus



C-Injection of fibrin glue



D- fibrin glue coming out of tract

3. CRYOSURGERY

Sinus tracts are laid open and curetted and the open wound is then sprayed with liquid nitrogen for 5minutes, done as out–patient procedure. delayed healing especially at the skin level. recurrence rates

ELECTROCAUTERISATION

Under local anesthesia, sinus tract are opened with diathermy knife. Track curetted and hair removed and track cauterized. procedure can be repeated depending up on healing. The rate of recurrence is 11%.

ELECTROCAUTERISATION

Options for management of a non-complicated chronic pilonidal sinus include:

1. excision with primary closure.
2. excision and laying open of the tract.
3. wide and deep excision to the sacrum.
4. incision and marsupialization.

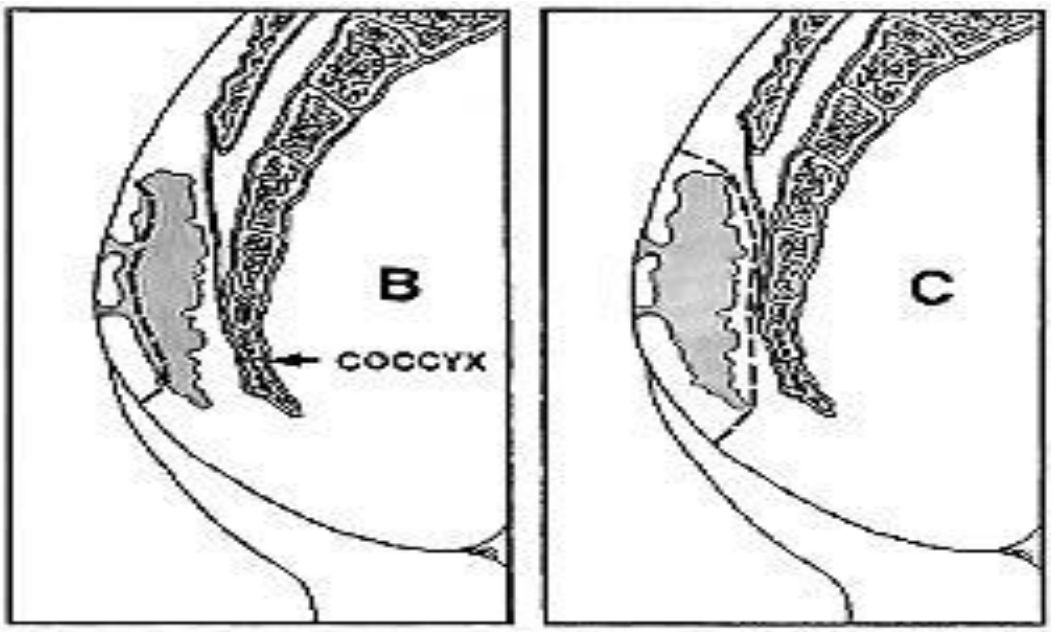
Surgical procedures are done under general or spinal anesthesia with patient in prone or jackknife position. After shaving off the hair and cleaning the area, methylene blue dye mixed with hydrogen peroxide, is injected in the external openings to give a guideline for the tract and branching.

1. EXCISION WITH PRIMARY CLOSURE

Excision of a pilonidal sinus means excision of the midline pits and lateral openings down to the presacral fascia, with removal of minimal surrounding skin. Removing more than 0.5cm of skin surrounding sinus opening is not ESSENTIAL. Curetting the wound to remove hair, granulation tissue, and skin debris is essential to promote adequate wound healing. mild sedation in addition to local anesthesia allows for complete excision and comfortable patient.

Lord and Millar 1965 described the technique of coring out of midline epithelial follicles under local anesthesia, but they included abrush in their procedure to cleanse the cored cavity of Hair. The brushing of the tracts continues in outpatient.. At the same time 50% phenol was used after curettage to destroy the epithelial component of the track. phenol injection gave similar results to surgery with patients staying in hospital for 1–2 days and returning to work within weeks; 60%healing with an average healing time of .2weeks.

The follicle excision sites may be closed primarily but are usually packed and dressed to heal by secondary intention.



Depth of excision required

Excision with primary closure

A-Simple excision of pilonidal sinus -Primary closure of wound

C-Excision of sinus Primary closure with drain

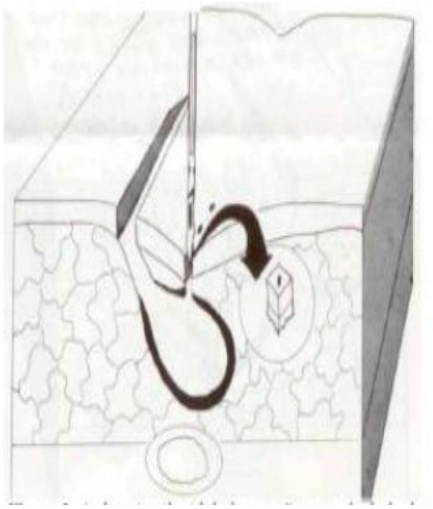
Bascom described lateral incision for entry into the pilonidal cavity. Curettage of the cavity is accomplished, through this lateral incision, which is not excised. The midline pits are excised separately, including the epithelialized tube. The midline incisions are closed, while the lateral wound may be either, left open to drain and heal by secondary intention or closed primarily.

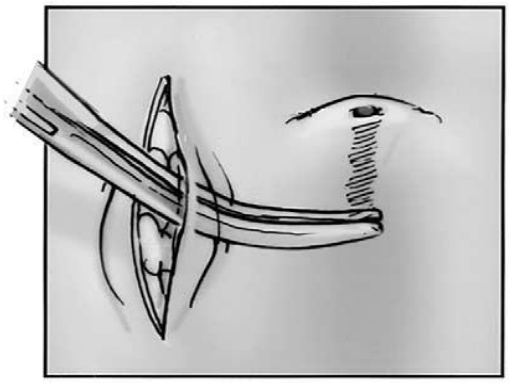
Advantages of primary closure are small wounds, quicker healing time, within 3weeks, minimal wound care, earlier return back to work

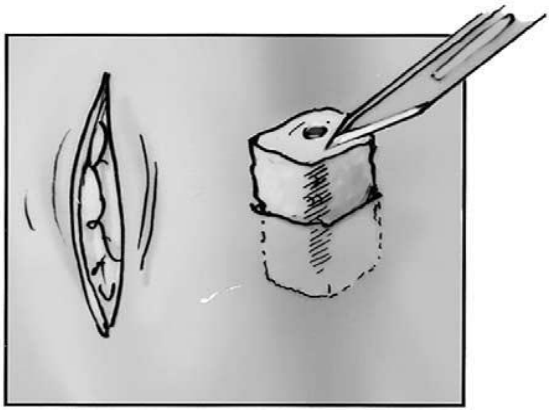
and dressing NOT needed daily. disadvantages are wound infection and wound dehiscence.

Rather than primarily closing a midline or lateral vertical incision, few surgeons, suggest the use of asymmetrical or oblique elliptical incisions in an attempt to keep incisions out of the natal cleft, where wound healing is poor ,and to prevent unnecessary tension on the closure of the wound. The goal of the asymmetric incision, is to reduce the depth of the gluteal fold, thereby eliminating the frictional forces between the 2 opposing skin edges. Although the use of an incision that crosses the vertical gluteal fold to excise the pilonidal cavity, does eliminate a vertical suture line within the gluteal fold, healing times may remain considerable.

Skin flaps are described to cover a sacral defect after wide excision. This keeps the scar off the midline and flattens the natal cleft. The potential complications include loss of skin sensation in the flap, which is seen in more than 50% of patients, and necrosis of the flap edges. primary healing is achieved in 90% of patients.







In the Bascom operation, midline pilonidal pits or follicles are excised. One to 10 follicles can be removed, leaving wounds 2–4 mm in diameter. The sinuses or cavity are opened through an incision, 2 cm lateral and parallel to the natal cleft. The lateral incision undermines the midline and gauze is pushed through the cavity to ‘‘scrub out’’ hair and granulation tissue

2. EXCISION WITH LAYING OPEN OF TRACT

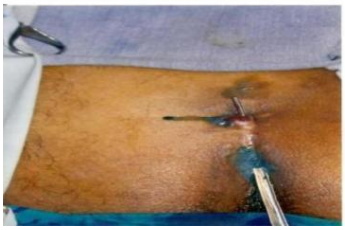
Excision of the pilonidal sinus and laying the tract open to allow healing by secondary intention has been described as to ensure that the cavity has adequate drainage. This overcomes a wound infection after primary closure. Consider laying the tract open, when the primary closure is not free of tension. Even after excision of the pilonidal sinus down to healthy presacral fascia, wound is still considered contaminated. Both aerobic and anaerobic organisms are found in 50-70% of wounds. The disadvantages of laying the tract open are inconvenience to the patient, with frequent dressing changes, and appropriate observation of wound to ensure proper wound healing and avoid premature closure of the edges., The average time for wound healing to occur is approximately 6weeks.

Laying the tract open is always appropriate when there is cellulitis surrounding the pilonidal sinus. Primary wound closure versus wound healing by secondary intention are the 2 principal surgical options for a chronic pilonidal sinus.

Differences remain between these 2 techniques in terms of wound healing and recurrence. Although primary closure has the potential for earlier wound healing if infection does not occur, it does require that the patient restrict many activities until wound healing is complete. This is because a primary closure is rarely completely free of

tension and the wound is considered contaminated despite excision and debridement.

Recurrence rates after primary closure may be as high as 38%. Not uncommonly, wounds may require 4-6months to heal, but on average, the healing time is approximately 2months. The reduced recurrence rate is felt to be due to more broad based, flattened and hairless scar produced by secondary intention. This prevents buttocks friction, hair penetration and hair follicle infection. these open wounds require aggressive management with frequent dressing changes and close observation by both the patient and the surgeon.



A-On table picture of laying B-9days post excision C-12days Status

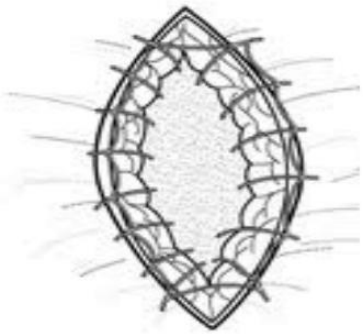
D-16days post excision E-20days post excision

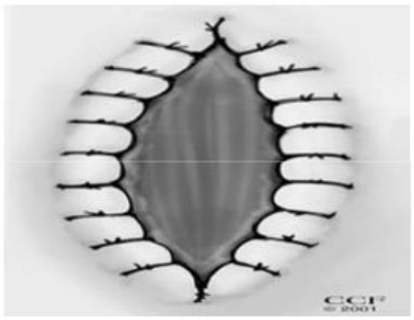
EXCISION WITH MARSUPIALIZATION

Marsupialization is a compromise between primary wound closure and wound healing by secondary intention. it is to avoid wound infection and dehiscence after primary closure and frequent packing of the open wound. With marsupialization, th wound is sutured open. After excision of the pilonidal sinus cavity, and lateral tracts, the cavity is then scrubbed and curetted to remove hair and granulation tissue. The skin edges of the wound are then sutured to the presacral fascia. The wound is then loosely packed and requires daily dressing changes.

Marsupialization provides the patient with a smaller wound compared to wounds that are left open to granulate. By suturing the wound open, wound infection is prevented, and the subcutaneous tissue is covered, resulting in reduced healing time. Healing is usually complete by 6weeks, and the recurrence rate has been reported to be 4-8%. marsupialization the preferred method of treatment for chronic pilonidal disease because it avoids closure of a contaminated wound and combines shorter healing times with a lower recurrence rate. The patient needs attention to personal hygiene, with daily wound cleansing and frequent hair shaving and removal.

Marsupialisation





D-During marsupialization E -After marsupialization F-5weeks later

4. WIDE EXCISION AND PRIMARY DRAINAGE

Wide local excision is done around the pilonidal sinus and healing occurs by secondary intention which takes a longer time but has a lower recurrence rate. Mean hospital stay is about 4 weeks. The healing usually gets delayed by secondary infection by anaerobic bacteria.

Tissue loss from previous attempts at excision further complicates the surgical management and limits options. The causes of recurrence are due to Missed out sinus during initial excisional surgery. Recurring infections leading to abscess.

Well known midline cleft with inward and outward forces promoting hair to grow into the scar and cause recurrence. Most common site for the recurrent pilonidal disease is the midline cleft with scar and due to poor wound healing. flap procedure will be required for the treatment of recurrent disease, wherein wide excision will be done and primary closure can be achieved with flap procedures ,and prevent the suture lines in the midline and the dead space is completely obliterated. this prevents the fricitional forces from causing the pilonidal sinus disease. flap closure are reserved for complex or recurrent pilonidal disease , simple conservative operative techniques initially used to treat chronic pilonidal disease. A wound that has failed initial therapy must be re-excised down to the sacro-coccygeal fascia. The re-excision must include the unhealed wound, scar and granulation tissue.

A-Plan for wide excision

B-2 weeks after wide excision

C-6 weeks post excision

D-10weeks post excision

CLOSURE OF THE DEFECTS

Following wide excision, Primary wound closure is achieved by doing a Flap closure.

1. Primary Closure of The Cleft
2. KARYADAKIS ADVANCEMENT FLAP PROCEDURE
3. ADVANCEMENT FLAP
    a. Z–PLASTY
    b. LIMBERG'S RHOMBOID FLAP
    c. V–Y ADVANCEMENT FLAP
    d. CROSSED TRIANGULAR FLAPS
4. GLUTEUS MAXIMUS MYOCUTANEOUS ROTATIONAL FLAP

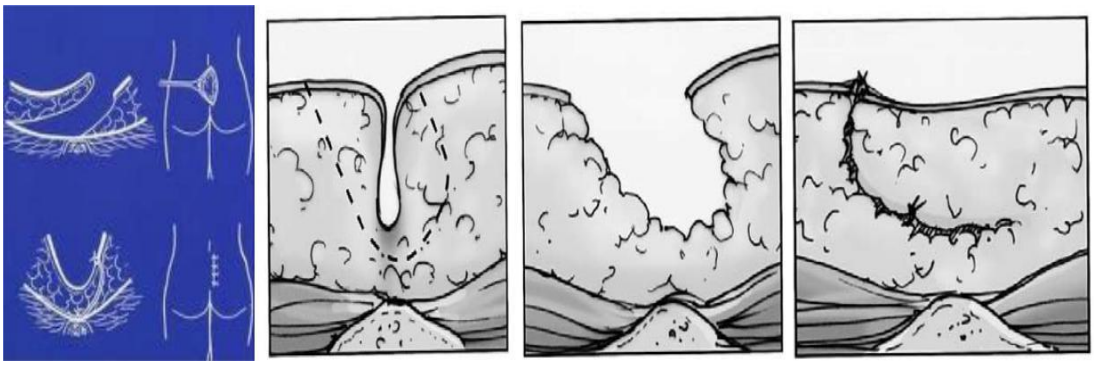
1. CLEFT CLOSURE

Primary closure of Cleft surgery was first described by Bascom, in that the mobilization and excision of the fat is not needed. Excision of the wound by placing, the apex of the incision lateral to the apex of the natal cleft and forming a triangular incision.Full thickness skin flaps are raised. Debris is removed and the sinus cavity,, is made free allowing the gluteal fat to appose . The inferior margin becomes crescent shaped, with its point positioned towards the anus.A skin flap involving only the dermis is created on the convex side of the lower wound margin. Excess skin is excised from one side, and the wound is closed. This reshapes the cleft,

making it shallower with the suture line displaced out of the fold.Before, procedure, the lateral edge of the raised skin flap should be defined by marking the line of contact of the buttocks. Then the edges of the skin are overlapped, and the excess skin is excised. This creates a primary closure that is off midline and obliterates the intergluteal cleft. The wound is closed in multiple layers by keeping a closed suction drain underneath. The recurrence rate is reported to be 3.3%.

KARYADAKIS PROCEDURE:

Thick flap created and advanced across the midline and primary closure done. Wound is closed in several layers after keeping the suction drain underneath. Karyadakis local advancement flap technique is considered as a primary procedure for pilonidal sinus.



ADVANCEMENT FLAPS

Local advancement flaps are

Z–plasty

Rhomboid flap

V-Y advancement flap

These are methods of covering defects which results from recurrent pilonidal disease.

ALTERNATIVES:

Myocutaneous flaps helps to reconstruct Complex wounds as these flaps heal well and helps to cover large area of skin loss.

They are less susceptible to infection

They have a predictable vascular supply that promotes better wound healing.

DISADVANTAGES:

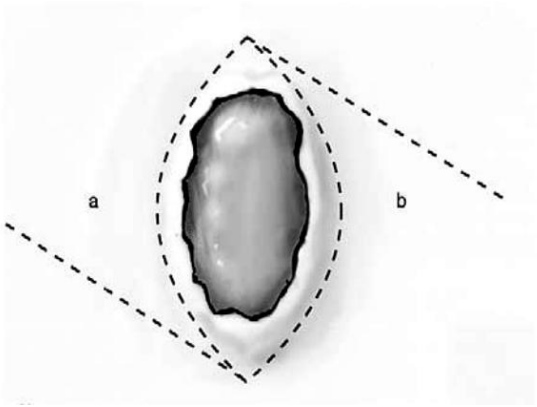
- Technically demanding techniques
- Recurrence rates range from 6 to 20%
- Prolonged hospitalization
- Lengthier operating time
- Failed flap is another great problem, which creates a additional extensive skin loss which is difficult to manage.
- So these techniques are only reserved for the Management of Complex Recurrent Wounds where other procedures have failed.

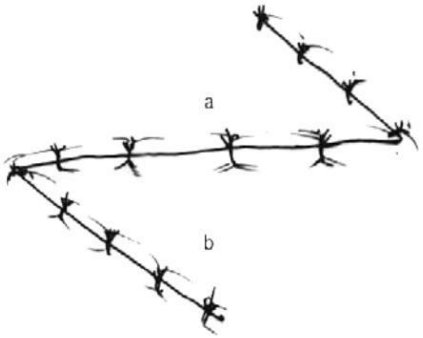
Z–PLASTY

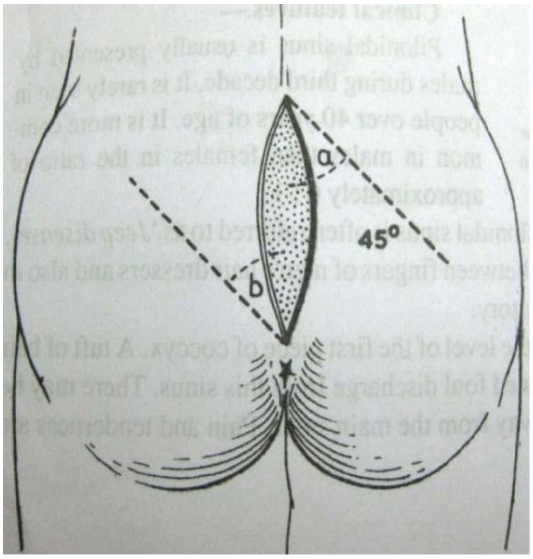
Obliterating the natal cleft and increasing the transverse length by recruiting the lateral tissue.

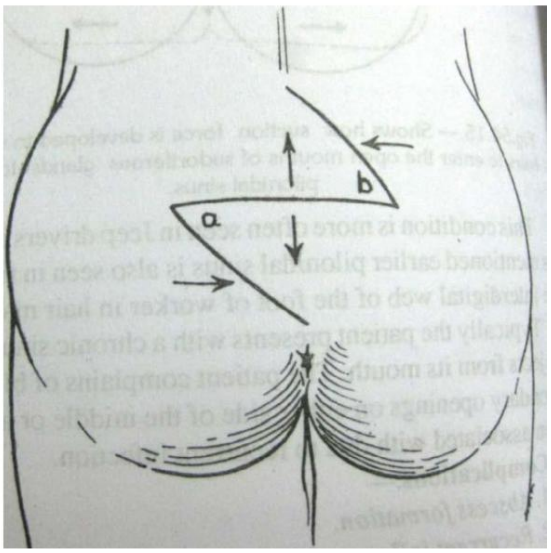
PROCEDURE:

- ❖ Excision of the midline sinus
- ❖ From the ends of the midline wound, the limbs of the “Z” are
- ❖ Subcutaneous flaps are raised upto the level of fascia
- ❖ Transposition of the flaps carried out
- ❖ Skin is closed.







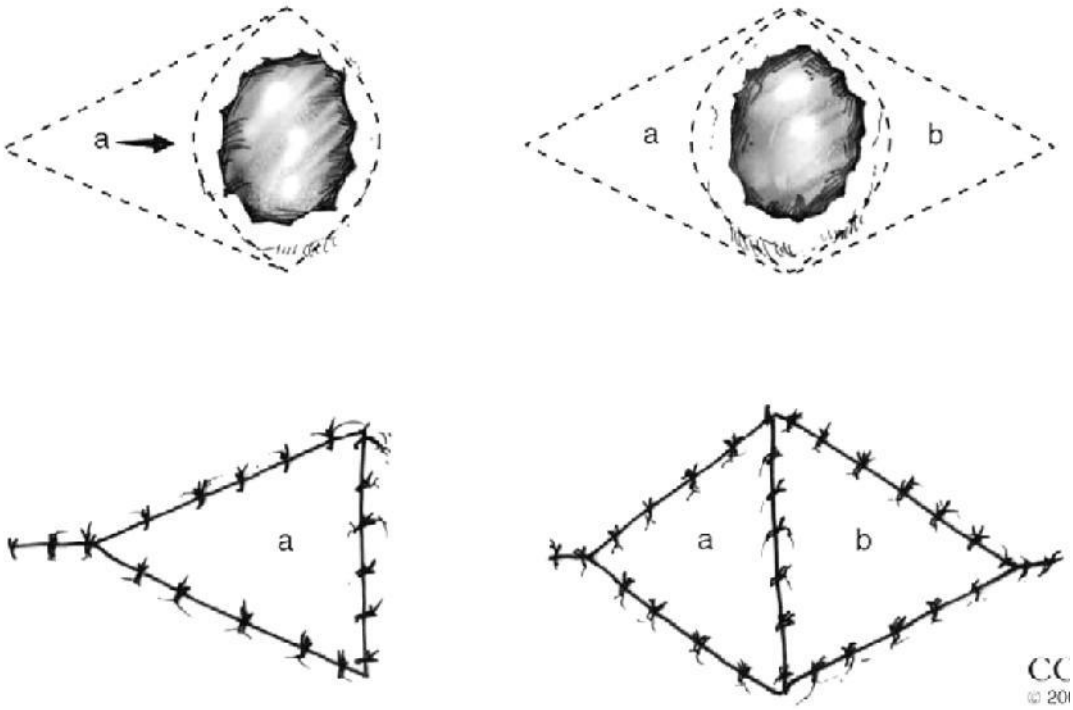


4. V-Y ADVANCEMENT FLAP

- The V-Y advancement flaps can be raised unilaterally or bilaterally.
- Unilateral flap will cover a defect 8-10cms in diameter.
- Bilateral flaps cover defects greater than 10cm.
- The flaps are raised upto the level of fascia and thereby composed of skin, fat and underlying gluteal fascia.

ADVANTAGES:

- Closure of the primary area can be achieved without tension
- Dead space can be obliterated easily
- Complete removal of all midline pits' and necrotic tissue can be achieved.
- Mean hospital stay was around 10 days
- Wound complication occurs at a rate of 8% .
- Long time recurrence rate of 5% after a follow up of 5 years.



V-Y advancement flap.

Unilateral advancement flaps

Bilateral advancement flap

Technique: Flap extended in a V fashion from the wound as marked by a. This is then advanced into the wound and secured. The resulting suture lines resemble a Y on its side because the area of harvest is re-approximated to simulate the stem of the Y.

CROSSED TRIANGULAR FLAPS ADVANTAGES

- ❖ Easy technique
- ❖ Early return to work and lesser hospital stay
- ❖ Cosmetically acceptable appearance postoperatively.
- ❖ Wound complication rate of 5%
- ❖ Recurrence rate 1.73%

PROCEDURE:

- ❖ A semicircular midline incision is made including all the sinus openings and excision of the sinus tracts are done.
- ❖ Zig zag incision across the wound in done to form multiple triangles, with apical part on one side of the wound and basal part on the other side.
- ❖ All apical parts of each triangle are excised, basal parts undermine, and haemostasis achieved.
- ❖ The wound is closed in a zigzag line, with the basal flaps crossing the midline to replace the apical parts.

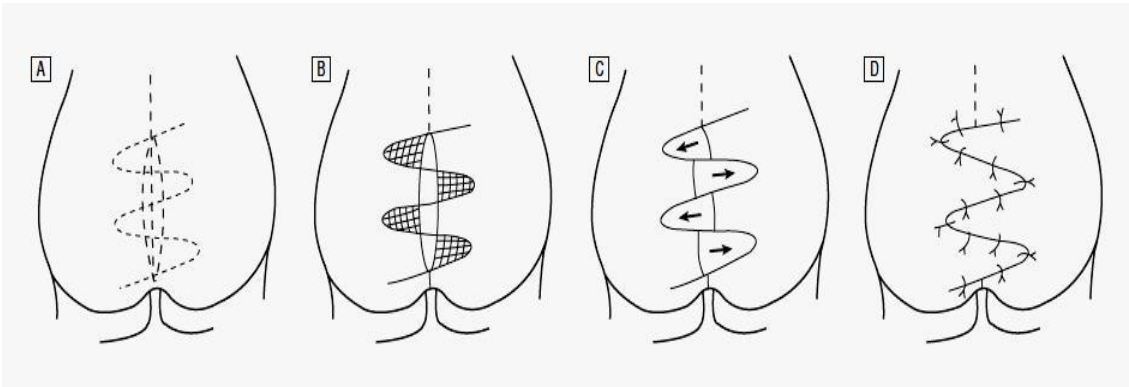


Diagram of crossed triangular flaps technique.

E. LIMBERG'S RHOMBOID FLAP

ADVANTAGES:

- Used to cover large defects
- Least likely to necrose as it is a well vascularized flap
- Flattens the gluteal cleft
- Closure can be achieved without tension
- Mean hospital stay is 6 days
- Recurrence rate is 4% following a follow up period of 74 months.

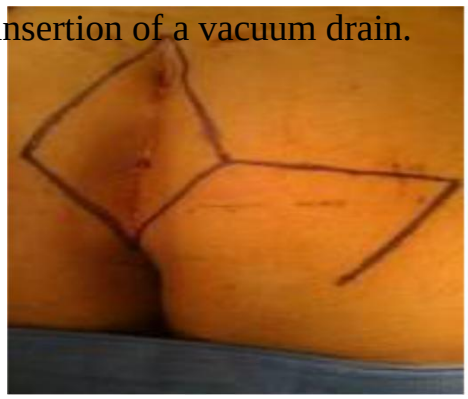
PROCEDURE:

Rhomboid incision made around the pilonidal sinus, and excision of all the existing sinuses down upto the presacral fascia, carried out.Incision enclosed rhombic area of skin, subcutaneous fat and sinuses excised along with lateral extensions.Long axis of the rhomboid is in midline and the short axis is transversely placed.

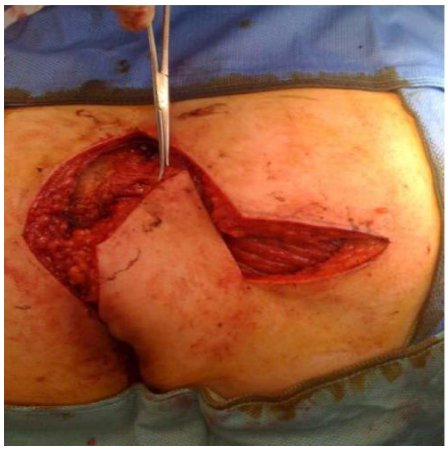
MEASUREMENTS:

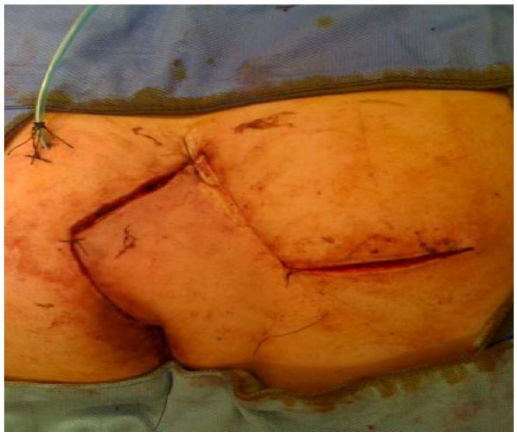
Rhomboid:-Line A-C drawn.Point C adjacent to the perineal skin.Point A placed so that all diseased tissue can be included in the excision.Line B-D transects the mid-point of A-C at right angles and is 60% of its length.D-E is a direct continuation of line B-D and is of equal

length to the incision B-A, to which it will be sutured after rotation.E-F is parallel to D-C and of equal length.After rotation it will be sutured to A-D. Flap consists of skin and fat and is constructed by extending the incision to the gluteal muscle fascia. The skin is approximated after insertion of a vacuum drain.

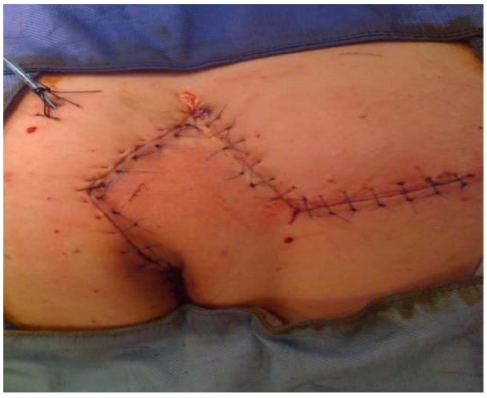


A-Plan for excision and incision of flap B-Excised specimen with incision over the flap





C-Rotation of flap to cover the defect D-Flap in place with drain



E-Final appearance of wound

GLUTEUS MAXIMUS MYOCUTANEOUS FLAP

The gluteus maximus myocutaneous flap is a rotational flap which consists of creation of large rotational flap.

ADVANTAGES:

With the gluteus maximum myocutaneous flap , radical excision of all diseased tissue can be done and the dead space can be filled with bulky well vascularized and compliant tissue.Very Large defects can be closed with gluteus myocutaneous flaps.It obliterates the natal cleft thereby eliminating the local anatomical factors responsible for the formation of pilonidal sinus.No tension will be created between the suture lines.

DISADVANTAGES:

Require lengthier hospital stay with 2 weeks being the average hospital stay and total time off work is 2 months.Wound dehiscence common.

The gluteus maximus musculocutaneous flap

USE OF DRAINS

The lengthier hospital stay in the patients in whom drainage tubes were kept postoperatively. Atlast, they concluded that drainage was not necessary.

With the usage of suction drains, the incidence of postoperative complications like hematomas and seromas have been reduced to zero. Literature shows successful closures have been obtained with the use of suction drains with Karydakis procedure, Rhomboid flap and Limberg flap techniques and some other have successful outcomes without the usagedrain

INVESTIGATIONS

Diagnosis of pilonidal disease is mostly clinical; there are no specific investigations that are needed for the confirmation of its diagnosis. However, in patients presenting with discharge, the discharge was sent for culture and sensitivity and appropriate antibiotic treatment was instituted. The most common organisms that were isolated were the anaerobic organisms , mixed growth was noted in a few and 4% of patients had a negative culture. These findings are similar to the western study that has a detailed evaluation organisms cultured in pilonidal disease. All the patients had undergone x ray lateral view of the lumbo-sacral region, and there was no radiological abnormality noted.if necessary MRI can be done. Unenhanced and post-gadolinium MRI was used to depict the anatomy and stage the recurrent pilonidal sinus disease (PSD). Fat suppression allowed visualizing oedematous inflammatory changes of the subcutaneous fat surrounding the sinus. After gadolinium contrast, enhancement consistent with inflammatory activity was seen at the periphery of the recurrent sinus and in the surrounding inflamed fat. Inflammation and sinus did not involve the levator ani muscles, anal sphincter complex and ischio-anal spaces. Based on MRI Findings - Pilonidal sinus is an acquired condition commonly present in the sacral region in young male adults with obesity and hirsutism.

The affected lesion was evaluated by computed tomography and magnetic resonance imaging before surgical removal. MRI can differentiate pilonidal sinus from post anal dermoid ,post anal dimple,congenital dermal sinus ,sacrococcygeal dermoid,,spinabifida occulta and myelocoele as these conditions communicates with meninges of central nervous system whereas pilonidal sinus has no communication with meninges of cns

COMPLICATIONS

The most common complications that were noted were infection and wound dehiscence and collection under the flap. The infection was treated with appropriate antibiotics and dressings and allowed to heal by secondary intention. Of the patients who had developed collection (sterile) which was drained and the site healed by secondary intention. patient who underwent v-y flap had wound infection and partial wound dehiscence of the lower flap which was treated by antibiotics and daily dressings and it ultimately healed by secondary intention over time. The rate of incidence of complications is noted to be higher in the primary suturinggroup

MATERIALS AND METHODS

STUDY DESIGN

The study was a prospective,parallel group,comparative trial among patients admitted with pilonidal sinus in general surgery wards at govt.rajaji hospital ,Madurai medical college,Madurai

STUDY METHODS

fifty patients were randomized into two groups

- PRIMARY SUTURING
- V-Y PLASTY GROUPS
- STUDY DURATION-6MONTHS
- ETHICAL CLEARANCE-OBTAINED
- CONSENT; INDIVIDUAL WRITTEN AND INFORMED CONSENT OBTAINED FROM ALL 50 PATIENTS
- CONFLICT OF INTEREST-NIL
- FINANCIAL SUPPORT-NIL

Eligibility Criteria

A. Inclusion criteria:

All patients undergoing PILONIDAL sinus excision

B. Exclusion criteria:

- Age Below 15 Years
- Patients With Acute Pilonidal Disease
- Pilonidal Abscess

- Malignancy

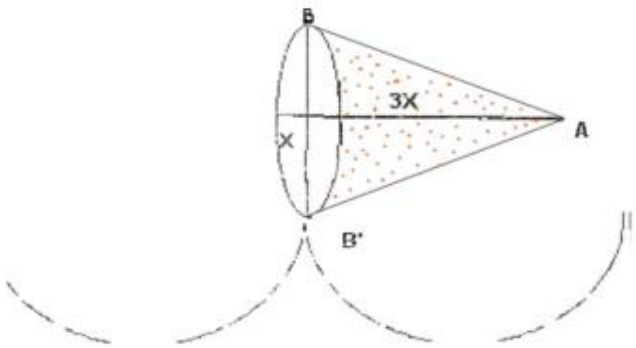
METHODOLOGY;

All patients undergoing pilonidal excision at Government Rajaji Hospital attached to Madurai Medical college. This is Prospective study . A written informed consent to be obtained from patients to be included in the study and data collected on printed Proforma included eg: Age, history of related complaints, general examination,local examination, biochemical evaluation of blood sugar,blood urea,serum electrolytes,pus culture and sensitivity and plain x-ray abdomen].Each athe patient. Postoperative course was carefully observed and criteria managed to analyse morbidity, hospital stay,and secondary infections. postoperative antibiotics were given according to pus culture and sensitivity reports.complications, both intraoperative and postoperative were noted. Patients were folled up 6months

PROCEDURE

Wide local excision of the lesion was done after injecting methylene blue and hydrogen peroxide through sinus to remove all remnants during excision. While excising the sinus, care was taken to go vertically down to the fascia only, as extension below it will hamper its blood supply, also to avoid cavity during approximation. En-block removal of multiple sinuses was done.After minimal debridement, size of defect was reassessed.V-Y design was marked on both sides of defect.

Breadth of the flap was equal to length of the defect for first few centimeters and gradually narrowing to form V. The length of the flap was equal to thrice the width of the defect.it is shown that ‘X’ is width of the defect and ‘3X’ is length of the flap.While creating bilateral flap, length of two flaps has to be unequal, that is, 2X on one side and 3X on other side, so that the suture line is not in midline.While making the design, care was taken to avoid creating an acute angle at corners

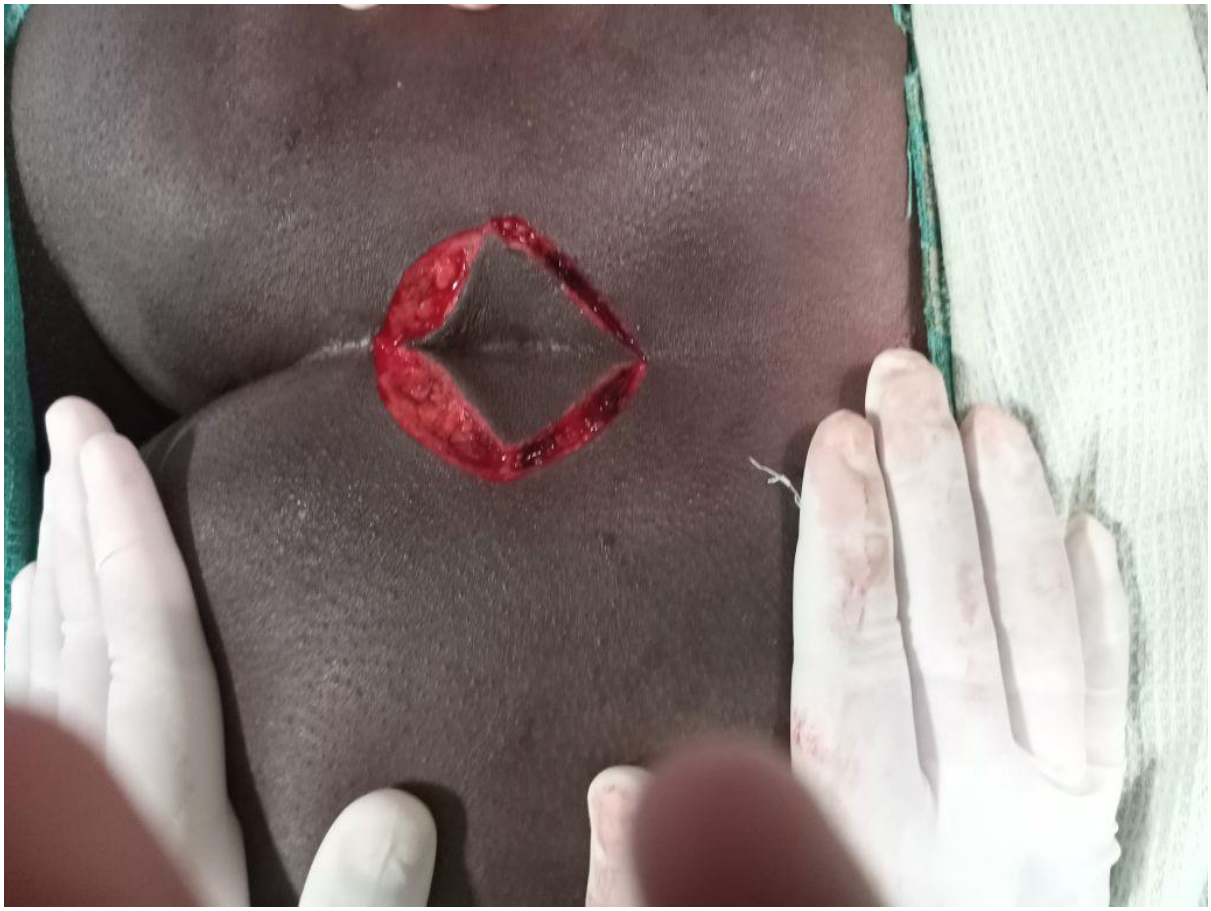


skin markings for unilateral V-Y flaps

The incision was carried down to the fascia of underlying gluteus maximum muscle. The upper and lower arms of the flaps were elevated and advanced on gluteal muscle toward the midline interdigiting opposite arm. Even a few fibers of gluteus muscle were cut to increase the mobility of the flap. Care was to be taken to avoid undermining of the flap, and thereby reducing the chances of injuring the perforators. After releasing the flap from all sides, it seems to be falling in midlineThe advancing edges were sutured to each other in two layers and initial V was sutured as Y to cover sacral defect with low tension

over suture line, which avoids suture breakdown. The advancing edge of the flap was undermined from sacral fascia for about 2–3 cm, so as to be sutured to soft tissue of the opposite side thereby avoiding dead space. After elevating the flap from one side, we assessed feasibility of tension-free closure. When in doubt bilateral flaps of unequal dimensions were used to avoid midline scar and obliteration of natal cleft

The use of SUPERIOR GLUTEAL ARTERY perforator-based advancement flap principle, in repair of relatively large pilonidal sinus, helps in efficient redistribution of available tissue in addition to reducing tension along the suture line. Also, the suture line is not in midline, so chances of recurrence at the suture site are minimal.Fasciocutaneous V-Y advancement flap can be modified according to the local defect size as unilateral, bilateral, bilateral equal, and unequal V-Y advancement flap.No drain was kept in any of the patients as there was no dead space.The mean operative time for flap surgery was 1 h.The average post-operative stay was 4 days.After suture removal, patients were advised oil massage for flaps, application of silicon gel for scars, and shaving or depilation in some forms such as cream, hair remover, and laser in natal cleft.



RESULTS

Pilonidal sinus is one of the least reported of diseases prevalent. Patients tend to seek advice mostly only when they are ridden with the complications of the disease and/or have a persisting disturbing discharging sinus. The patients presented to the doctor with complaints were only tip of the ice berg .Not many studies have been conducted in India to know the prevalence and incidence of the disease. Many go unreported and under diagnosed or even misdiagnosed. A total of 50patients were admitted with complaints relating to pilonidal disease and its complications. The above patients were included in the study; findings noted, appropriate treatment instituted and followed up for a period of 6months.

SEX INCIDENCE

The Indian male for obvious reasons like more hair distribution and occupation were noted to be more prone for the disease than the female counterpart. The male: female ratio was noted to be approximately 5:1.

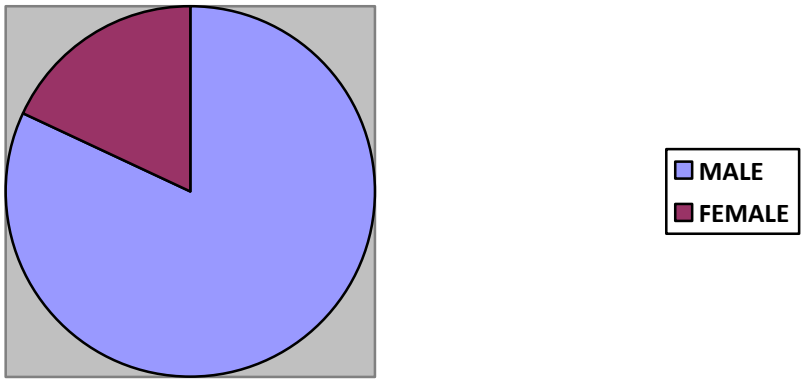


Table-1 Sex Incidence

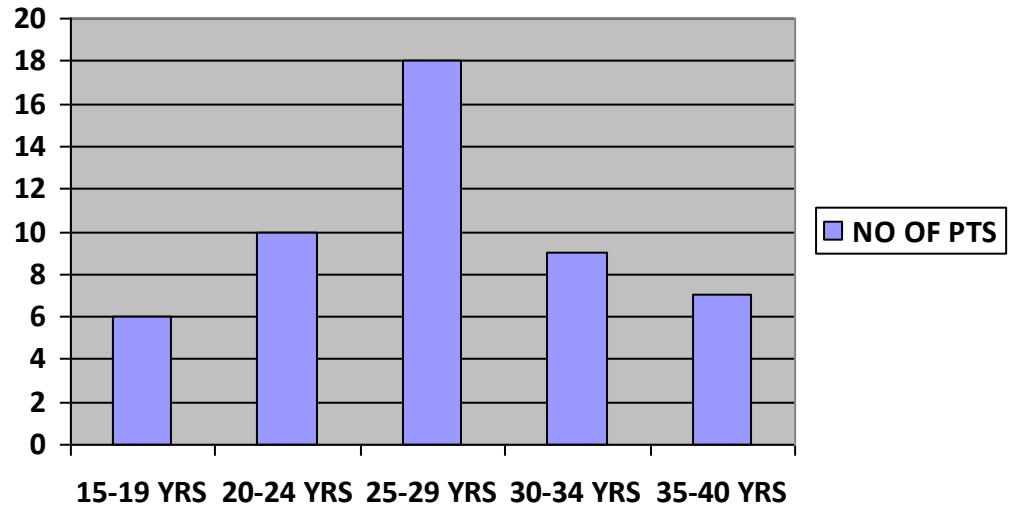
Gender	**Number of Patients**	**Percentage (%)**
Males	41	82
Females	9	18
Total	50	100

AGE INCIDENCE

Pilonidal disease commonly affects the young people. It is not seen in the older age groups unless the cause has been because of poor previous treatment.

Table-2 Age Incidence

Age Group (in years)	Number of Patients	Percentage (%)
15-19	6	12
20-24	10	20
25-29	18	36
30-34	9	18
35-40	7	14
Total	50	100



As noted in the comparative study, the mean age of presentation of pilonidal disease is in the mid twenties

OCCUPATION INCIDENCE

Occupation has a role in the development of pilonidal disease. During the World War-II, it was found to be common among jeep driver, hence the name "*Jeep bottom".* It seen in people who have a work pertaining to prolonged duration of sitting and close to vibrating surface.

Table-3 Occupational Incidence

Occupation	Number of Patients	Percentage (%)
Bus driver	6	12
Student	5	10
daily wager	6	12
Agriculturist	8	16
Garment factory worker	5	10
Shop keeper	6	12
Taxi driver	5	10
Auto driver	5	10
Clerk	4	8
Total	50	100

Though called *"Jeep Bottom"* as it was noted to be more common in the jeep drivers of the World War-II, there have been no definitive studies done to note that the disease is more common in patients who have history of prolonged sitting and those who are close to vibrating strutures.

EXAMINATION FINDINGS

Table-4 Examination findings

Signs	Number of Patients	Percentage (%)
Swelling	40	80
Sinus	49	98
Discharge	47	94
Abscess	14	28
Deep Natal Cleft	50	100

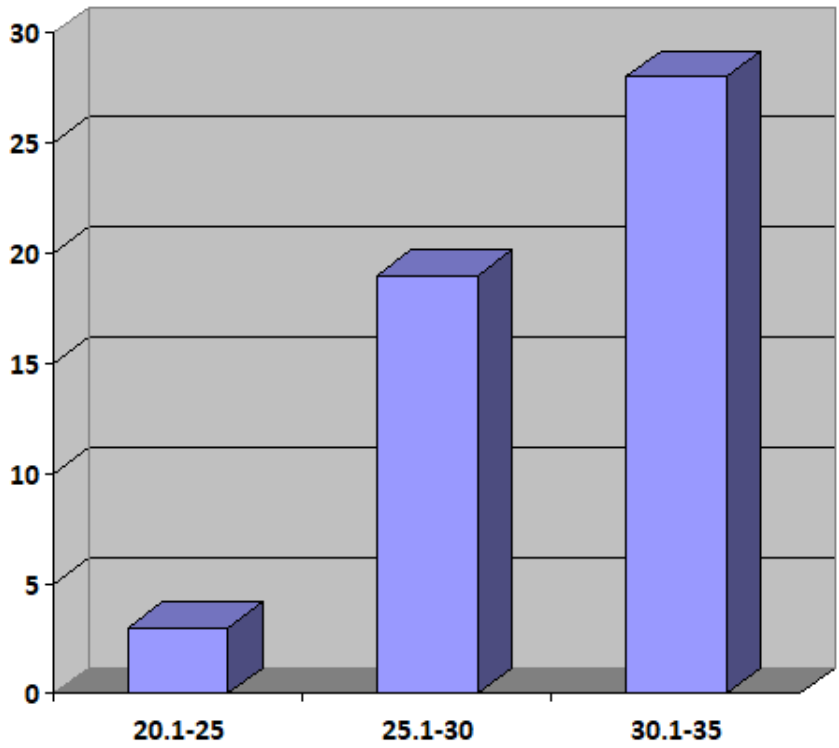
All patients has a deep gluteal cleft. Many patients has history suggestive of discharge in the sinus. Many patients has history of swelling. But the patients who presented with all the three had an abscess which required immediate intervention.

Disease is common in hirsute males with deep natal cleft and presence of sinus (single and/or multiple) is almost a constant feature of all patients who presented with pilonidal disease.

BODY MASS INDEX

The incidence of increased body mass index with the incidence and even recurrence of pilonidal sinus.

Body Mass Index	Number of Patients	Percentage (%)
20.1 – 25	3	6
25.1 – 30	19	38
30.1 – 35	28	56
Total	50	100



PUS FOR CULTURE SENSITIVITY

Many patients presented with both complaints of discharge and presence of discharge on presentation. so as prophylactic measure all patients pre-operatively underwent pus for culture and sensitivity test and appropriate antibiotics was started . next table shows the organisms cultureds from the site of sinus and its comparative analysis.

Table-7 Pus Culture Report

Organism	Number of Patients	Percentage (%)
Staphylococcus aureus	12	24
Pseudomonas aeroginosa	3	6
Bacteroides fragilis	17	34
Escherichia coli	10	20
Proteus mirabilis	3	6
Mixed growth	3	6
No growth	2	4
Total	50	100

IT concluded that the most common organisms found in the pilonidal sinus are the anaerobic organisms.

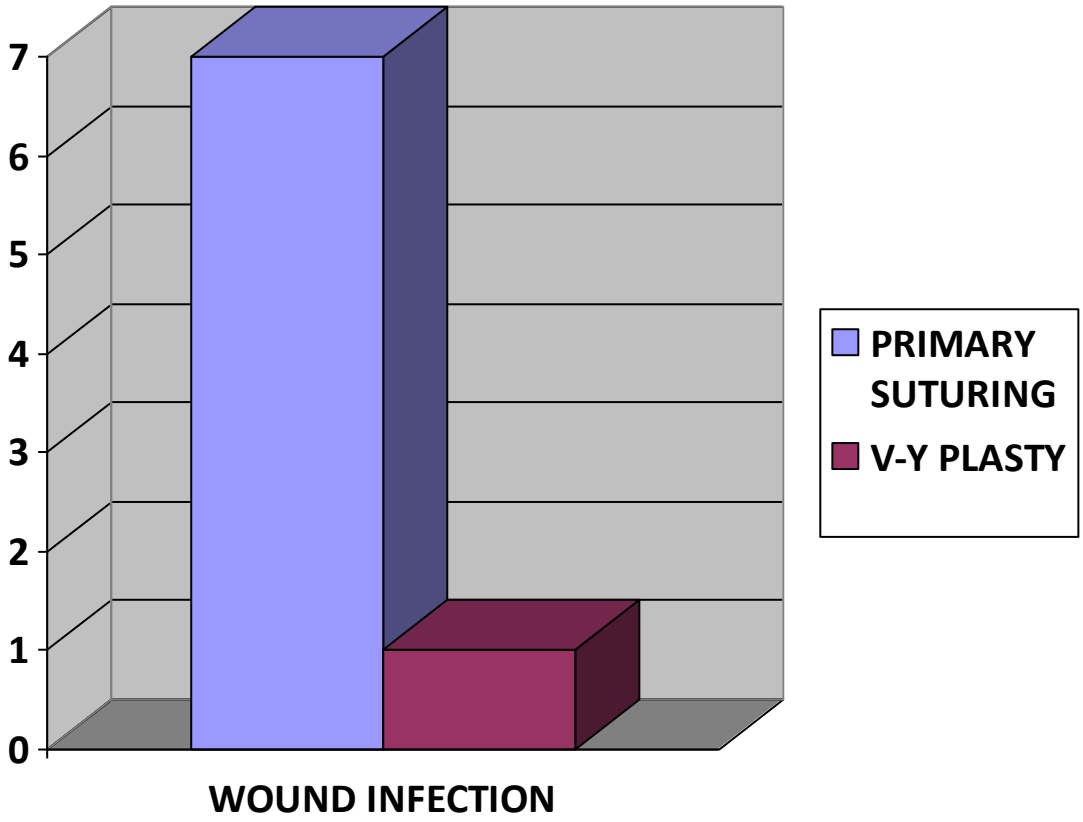
INCIDENCE OF COMPLICATIONS

The most common complications encountered in this study were:

- ❖ Wound infection which was more in primary suturing
- ❖ Wound dehiscence was more in the patients undergoing primay closure
- ❖ Collection which was noted in patients undergoing both primary suturing and flap study.

Incidence of wound infection

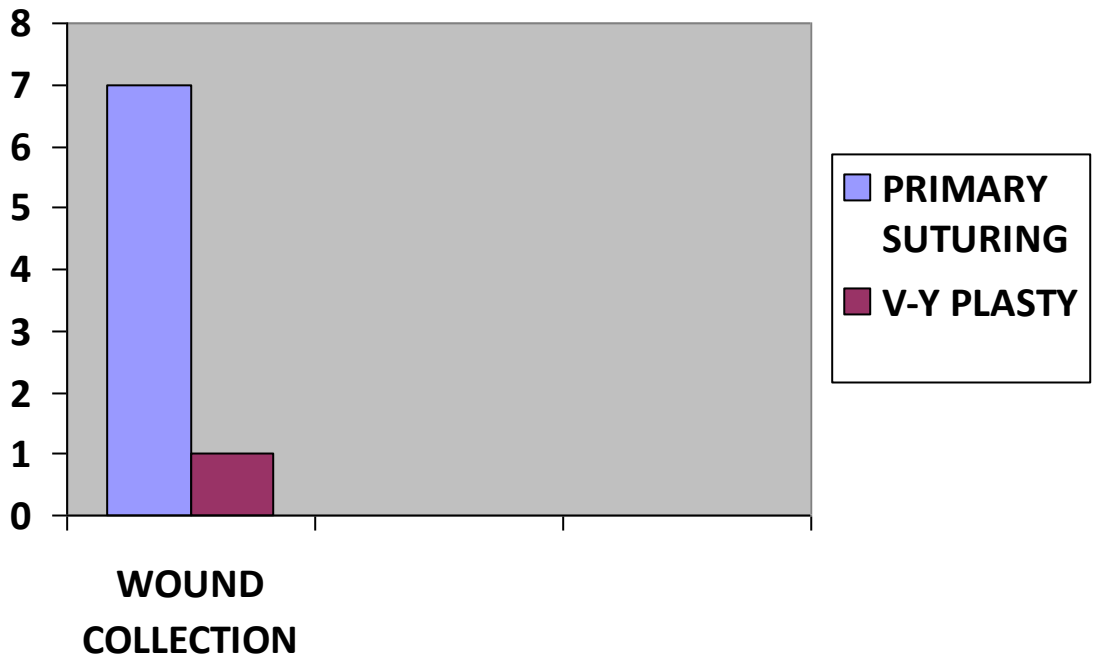
PROCEDURE	NO.PATIENT	WOUND INFECTION
PRIMARY SUTURING	25	7
V Y PLASTY	25	1



P VALUE-0.04 SIGNIFICANT

Incidence of wound Collection

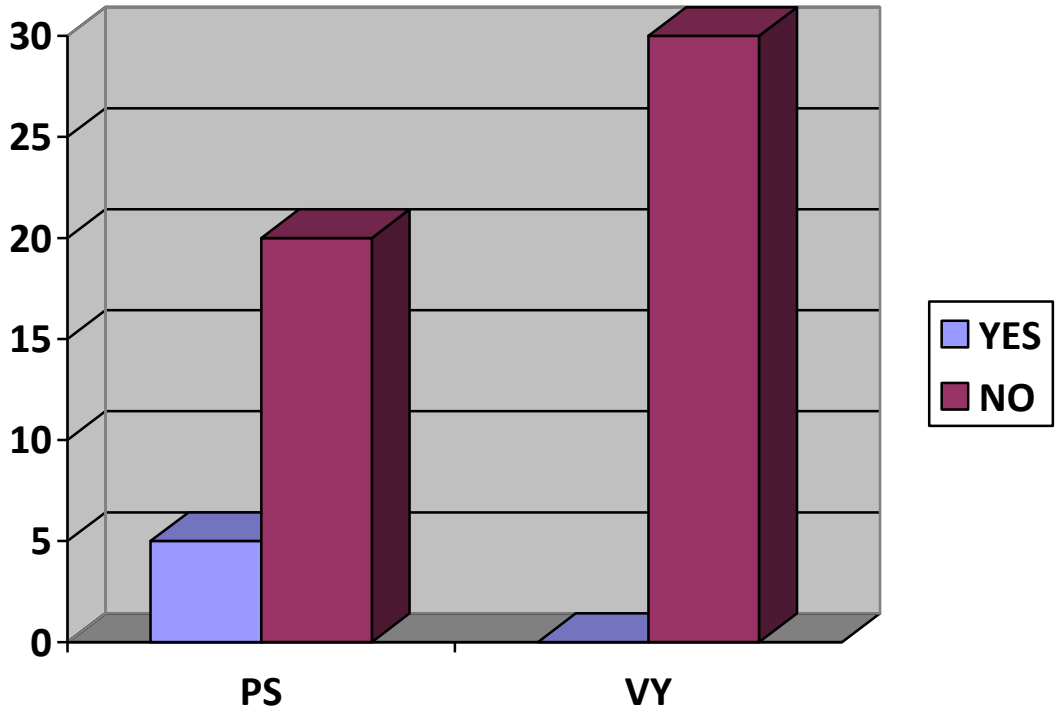
PROCEDURE	NO.PATIENT	WOUND COLLECTION
PRIMARY SUTURING	25	7
V Y PLASTY	25	1



PVALUE-0.04 SIGNIFICANT

Incidence of Wound Dehiscence

PROCEDURE	NO.PATIENT	WOUND DEHISCENCE
PRIMARY SUTURING	25	5
V Y PLASTY	25	0

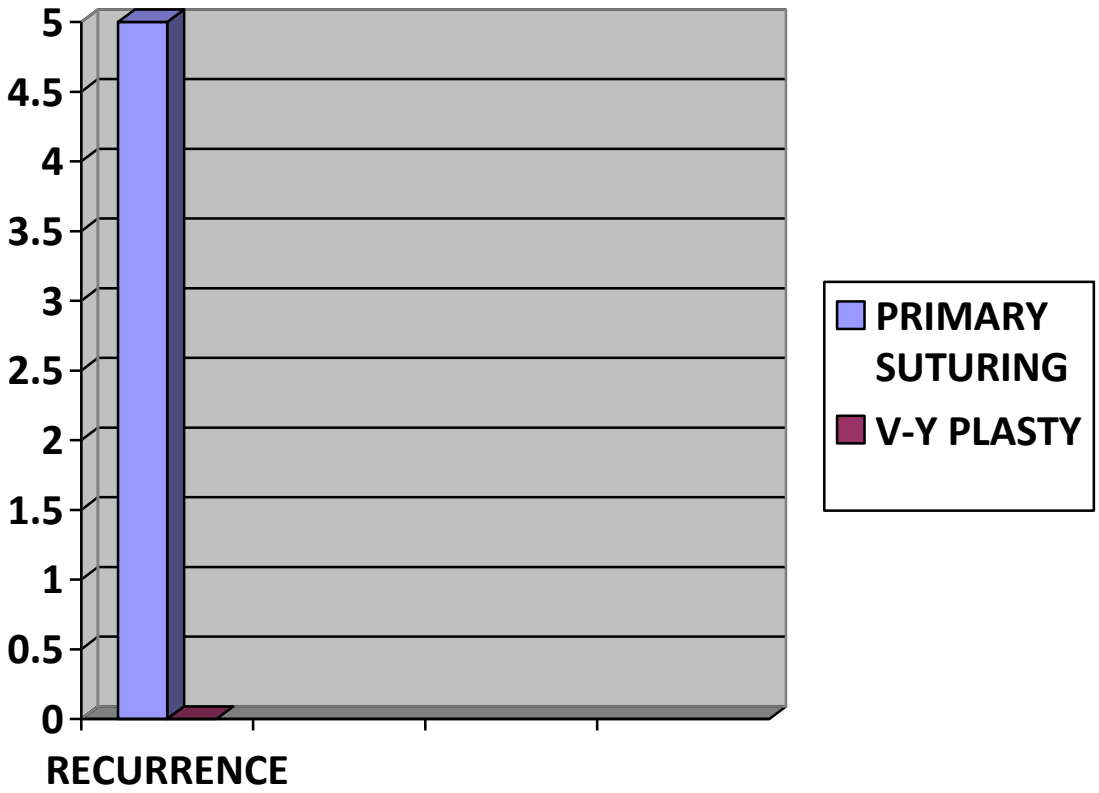


PVALUE-0.001 SIGNIFICANT

RECURRENCE

Recurrence rate is more with primary suturing when compared with v-y advancement flap

PROCEDURE	NO OF PTS	RECURRENCE
PRIMARY SUTURING	25	5
V-Y PLASTY	25	Nil

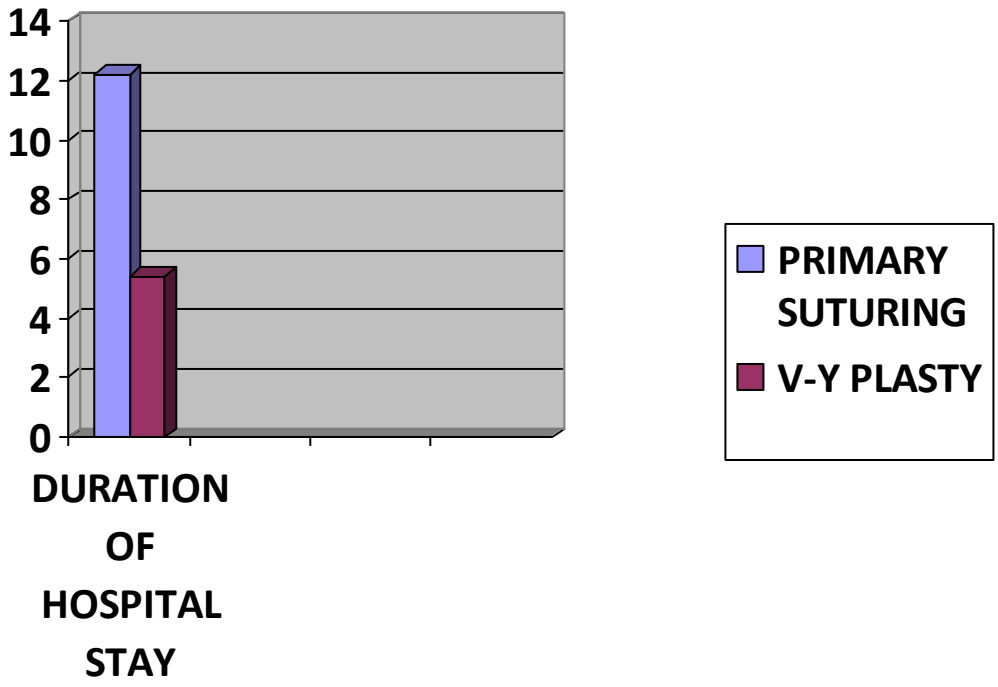


PVALUE-0.018 SIGNIFICANT

DURATION OF HOSPITAL STAY

Our study shows the hospital stay duration found to be very less in patients treated with flap procedures than who underwent primary suturing.

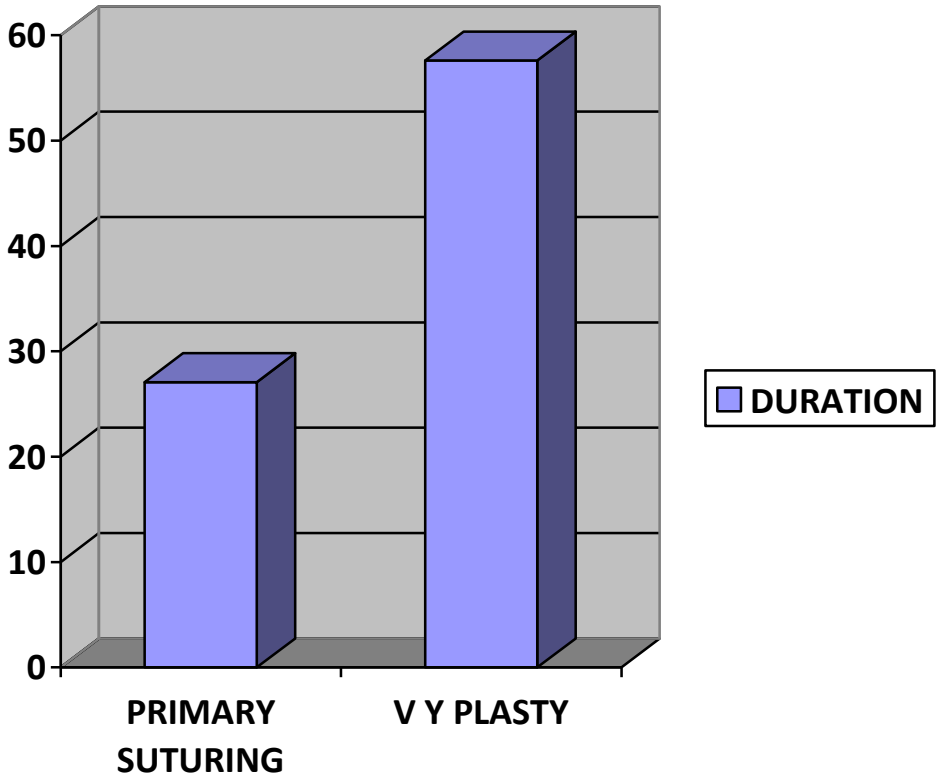
PROCEDURE	MEAN DURATION OF HOSPITAL STAY
PRIMARY SUTURING	12.24
V-Y PLASTY	5.4



P VALUE-0.OOO SIGNIFICANT

DURATION OF SURGERY

	MEAN
PRIMARY SUTURING	27.08
V Y PLASTY	57.6



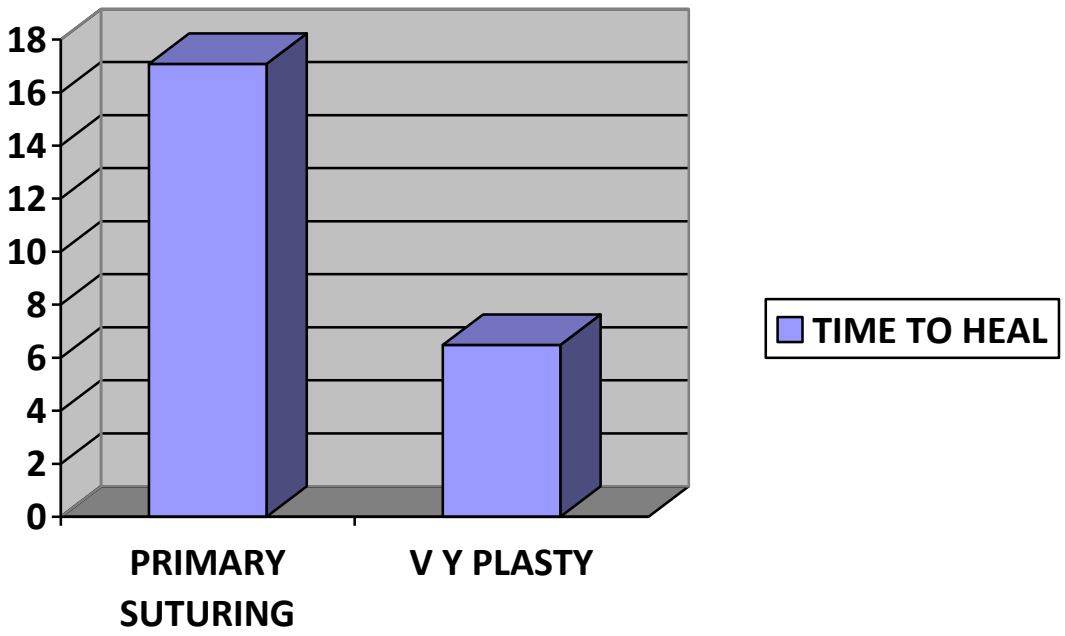
P VALUE - 0.000 SIGNIFICANT

TIME TAKEN TO HEAL

The total time taken for the wound/flap to heal was noted to be significantly lower in patients undergoing v-y flap procedure. This correlates with studies that prove that the average time taken for wide excision and primary suturing to heal is about 17.08 days . In patients undergoing V-Y flap procedure, the healing time noted in the present study is 6.48 days.

PROCEDURE	TIME TO HEAL
PRIMARY SUTURING	17.08
V-Y PLASTY	6.48

P VALUE-O.OOO SIGNIFICANT



DISCUSSION

Pilonidal sinus is a chronic intermittent disorder of the sacrococcygeal region and its treatment, usually surgical, remains controversial. Factors implicated in its etiology are large buttocks with deep natal cleft , adolescent or young males with positive family history, folliculitis at another site, obesity , occupations requiring prolonged sitting, traveling or driving, excessive body hair and poor local hygiene . Although various modalities of treatment have been described, no consensus has emerged as all have met with varying degrees of recurrence The two main factors were responsible for recurrence due to hair penetration, namely, the depth of the cleft and the presence of a portal of entry for hairs in the midline (the wound) Surgical treatment of chronic pilonidal sinus by excision of the diseased tissue down to the presacral fascia is generally accepted, but the management of the remaining defect is still a matter of debate. Many methods have been described such as (1) open excision, (2) primary closure, and (3) excision and flap closure.Open excision and healing by the secondary intention technique is associated with long hospitalization, wound dressing daily, increased postoperative morbidity, loss of work days, and poor cosmetic outcome due to wide unacceptable scars Primary closure of the wound is a simple technique, but it has a high recurrence rate (5–7%) due to continuing deep natal cleft . Excision with local flap procedures has the lowest recurrence rates, but they are more technically demanding and

their use is generally restricted to recurrent complex pilonidal sinus, there was no recurrence in the flap method. This could be explained by placing the scars away from the midline, thus avoidance of portal entry of hairs in the midline (the wound) and flattening the natal cleft to reduce friction, local warmth, moisture, and hair accumulation. To address the flap survival of the technique, gluteal perforator vessels could have contributed to its viability in penetrating through the fascia to the overlying skin . Pilonidal sinus never begins on a convex surface and the primary source of surgical failures is the shape of the gluteal cleft, which creates the moist, warm, bacteria-friendly environment and thus reducing the depth of the concave fold that harbors the problem.

The Z-plasty procedure has been described by Monro and MacDermot.The disadvantage of this procedure is that the part of the wound is in the midline, which is the main cause of recurrence. Besides the flap tip, necrosis has been reported. Z-plasty requires back cuts and incisions at specific angles and is not supplied by robust perforators like V-Y-plasty, technically demanding as geometrical planning is involved.

The W-plasty technique has been described by Roth and Moorman. but some part of the wound was in midline and recurrence rate was high.

The Limberg flap is another transposition technique; it is suitable only for closure of rhomboid defects with angles of 60 and 120° and the flap depends on the looseness of adjacent skin. Reported complication and recurrence tes are 6 and 4%, respectively The Limberg flap scores in

simplicity, but it needs excessive mobilization. It also needs an expert surgeon and more excision of a normal skin for making the rhomboid shape of 60 and 120°.Closure of the defect with Limberg flap seems to be elliptical rotation flap at first glance . however, it creates a line of tension along the radius of the arc that may necessitate back cuts. This decreases the blood supply to the flap. It has recurrence rate of 8% .

Perforator-based flaps require meticulous technique and expertise. These flaps are having the long learning curve and having the risk of terminal necrosis.

V-Y advancement flap is easier to perform. The flap has excellent blood supply and can be raised safely without dissecting of the pedicle. flap, which can be quickly harvested, and has got a lesser learning curve.

Our technique is simple and reliable and offers an effective and elegant alternative to the more classic operations for pilonidal sinus as it has the advantage of being tension-free closure without leaving dead space, thus increasing patient comfort and wound healing, and decreases the length of hospital stay with early return to work. It does not only remove the existing sinus but also eliminate factors that predispose to formation of another sinus by placing the scars away from the midline and flattening the natal cleft, and it is useful for recurrent cases after a failed surgical procedure and it gives good cosmetic results without any early or delayed recurrence.

CONCLUSION

V-Y-plasty is better choice among the flaps as it is less demanding, it is not operator dependent.

So, conclude that pilonidal sinus, which is found more commonly in hairy, obese males with sedentary life style.it is treated more effectively, with no recurrence rate and less complications by wide local excision followed by asymmetric closure by unilateral or bilateral V-Y fasciocutaneous advancement.

SUMMARY

- Pilonidal disease is a disease that is not routinely reported.
- Though common in the natal cleft, extra natal sites also have been reported.
- It is an acquired condition due to various predisposing factors.
- It is more common in males compared to the females.
- It affects young adults and is rarely seen after the age of 40 yrs.
- Presentation may vary from asymptomatic pits to chronic pain and discharging sinuses and acute presentations of abscess.
- Patients with an increased body mass index and those with a deep natal cleft are more prone for it.
- Patients who work for prolonged sitting and those close to vibrating machinery are more prone to develop this disease.
- The most common organisms isolated from the pilonidal sinus are anaerobes.
- Though sterile cultures and occasional mixed growth is also noted.
- The main goals of pilonidal treatment are maintaining good personal hygiene and regular epilation of the local area and a definitive good surgical procedure.
- The main stay for treatment of pilonidal abscess is incision and drainage through a lateral incision away from the mid line.

- This is not a definitive procedure and the rates of recurrence are very high.
- There are a wide variety of treatments both surgical and non-surgical that are advocated in the management of pilonidal disease.
- All treatments have their own advantages and disadvantages with respective complications and recurrence rates.
- Among all, it is the flap procedures which have a low recurrence, less duration of hospital stay and early return to work.
- Hence flap techniques-is the most effective surgery to treat pilonidal disease.

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ANNEXURE

CASE SHEET PROFORMA

Name	Date of presentation
Age/Sex	Date of admission
Occupation	Date of surgery
I P Number	Date of discharge

Chief complaints

Pain

Mode of onset

Site of pain

Duration of pain

Type of pain

Character of pain

Aggravating

factors Relieving

Swelling

Number

Duration

Aggravating factors

Relieving factors

Discharge

Duration

Amount

Foul smelling

Blood stained

Fever

Difficulty is sitting

Past History

History of similar complaints

Duration

Number of episodes

Mode of intervention

Number of interventions

Other Medical / Surgical

Illnesses

Family History

Personal History

Diet

Appetite

Sleep

Health hazardous habits-

Tobacco

consumption

Alcohol

consumption

Bowel habits

Bladder habits

Obstetric and menstrual history in females

Drug/allergy history

General	**Physical Examination**
Built	Nourishment
Height	Weight
Body Mass Index	
Vital Signs	
Pulse	Temperature
B.P.	Respiratory rate

Cardinal Signs

Pallor

Icterus

Cyanosis

Clubbing

Lymphadenopathy

Oedema

Systemic Examination

Cardio vascular system

Respiratory system

Central nervous system

Musculoskeletal system

Per abdomen

Local Examination

Inspection

Natal cleft

Deep/superficial

Sinus

Number

Site

Swelling Site

Number

Size

Shape

Extent

Surface

Skin

Surrounding area

Discharge

Amount

Foul

smelling

Serous

Purulent

Associated with hair

Palpation

Local rise of temperature

Tenderness

Induration

Fibrosis

Examination of spine and pelvis

Per rectal examination

Clinical Diagnosis

Pilonidal sinus

Pilonidal cyst

Pilonidal abscess

Investigations

Routine investigations

Hemoglobin percentage

Total count

Differential count

Erythrocyte sedimentation rate

Bleeding time

Clotting time

Urine for protein, sugar and microscopy

Random blood sugar

Blood urea

Serum creatinine

H.I.V.

Hbs.Ag.

Specific Investigations:

Pus for culture and sensitivity

Chest Radiograph

Electrocardiograph

X - ray lateral view of the lumbo – sacral spine, MRI

LUMBOSACRAL REGION

Treatment

Surgery, v-y advancement Flap, Wide excision and primary suturing

Histopathological report

Post Operative period

Management

Complications

Follow up

Sl.	Name	Age	Sex	PROCEDURE	DOS MIN	DOH SPO	TFH	COMPLICATIONS			Follow up
								WI	WD	Collection	
1	Kanimozhi	19	F	VY	57	5	5	NO	NO	NO	NO
2	ramakrishnan	27	M	VY	56	6	6	NO	NO	NO	NO
3	Kiruthiga	29	F	VY	60	5	7	NO	NO	NO	NO
4	chinnasamy	28	M	VY	57	5	7	NO	NO	NO	NO
5	sundaramoorthy	39	M	VY	59	5	7	NO	NO	NO	NO
6	Jayalakshmi	17	F	VY	58	5	7	NO	NO	NO	NO
7	Murugan	34	M	VY	57	5	7	NO	NO	NO	NO
8	Ramar	22	M	VY	58	5	7	NO	NO	NO	NO
9	Pandiyan	27	M	VY	59	5	7	NO	NO	NO	NO
10	Kannambal	28	F	VY	60	5	7	NO	NO	NO	NO
11	Maharajan	33	M	VY	57	5	10	YES	NO	YES	NO
12	Arumugam	24	M	VY	56	5	7	NO	NO	NO	NO
13	Charles	18	M	VY	58	6	6	NO	NO	NO	NO
14	Pasupathi	29	M	VY	59	5	5	NO	NO	NO	NO
15	Sathish	40	M	VY	60	6	6	NO	NO	NO	NO
16	Selvakumar	31	M	VY	56	5	7	NO	NO	NO	NO
17	Rahul	19	M	VY	54	6	6	NO	NO	NO	NO
18	Gopal	28	M	VY	55	5	5	NO	NO	NO	NO
19	Karthikeyan	24	M	VY	58	6	6	NO	NO	NO	NO
20	Rajan	30	M	VY	56	6	6	NO	NO	NO	NO
21	Abdulrahman	39	M	VY	57	6	6	NO	NO	NO	NO
22	vidhya	22	F	VY	58	6	6	NO	NO	NO	NO
23	Ranjith	25	M	VY	59	6	6	NO	NO	NO	NO
24	Viswanathan	29	M	VY	60	6	6	NO	NO	NO	NO
25	Dravidan	32	M	VY	56	5	7	NO	NO	NO	NO
	MEAN				57.6	5.4	6.48				

Sl.	Name	Age	Sex	PROCEDURE	DOS	DOH	TFH	COMPLICATIONS			Follow up
					MIN	SPO		WI	WD	Collection	
1	Ramesh	34	M	PS	30	10	14	NO	NO	NO	NO
2	Ganapathy	26	M	PS	25	10	14	NO	NO	NO	NO
3	Sundaram	27	M	PS	27	21	28	YES	YES	YES	Recurrance
4	Karthiga	16	F	PS	25	10	14	NO	NO	NO	NO
5	Vijayashankar	34	M	PS	26	21	28	YES	YES	YES	Recurrance
6	Suresh	28	M	PS	28	10	14	NO	NO	NO	NO
7	Maheswari	21	F	PS	30	10	14	NO	NO	NO	NO
8	Silambarasan	36	M	PS	25	14	21	YES	YES	YES	Recurrance
9	Rajeshwari	28	F	PS	25	10	14	NO	NO	NO	NO
10	Rajasekar	23	M	PS	26	10	14	NO	NO	NO	NO
11	Nagarajan	29	M	PS	28	10	14	NO	NO	NO	NO
12	Arulpragasam	39	M	PS	27	10	14	NO	NO	NO	NO
13	Lakshmi	23	F	PS	25	10	14	NO	NO	NO	NO
14	Kandasamy	29	M	PS	30	10	14	NO	NO	NO	NO
15	Dinesh	18	M	PS	26	10	14	NO	NO	NO	NO
16	Rajesh	34	M	PS	27	21	28	YES	YES	YES	Recurrance
17	Kumar	27	M	PS	29	10	14	NO	NO	NO	NO
18	Vijayakumar	24	M	PS	25	14	21	YES	NO	YES	NO
19	shanthakumar	26	M	PS	26	10	14	NO	NO	NO	NO
20	Saravavan	21	M	PS	27	10	14	NO	NO	NO	NO
21	Moorthy	38	M	PS	28	21	28	YES	YES	YES	Recurrance
22	Ramasamy	32	M	PS	29	10	14	NO	NO	NO	NO
23	Karuppasamy	37	M	PS	30	10	14	NO	NO	NO	NO
24	Anand	26	M	PS	26	14	21	YES	NO	YES	NO
25	Ranga	22	M	PS	27	10	14	NO	NO	NO	NO
	Mean				27.8	12.24	17.08				

MASTER SHEET

DOS	:	DURATION OF SURGERY
DOHSPO	:	DURATION OF HOSPITAL STAY POSTOP
TFH	:	TIME FOR HEALING
WI	:	WOUND INFECTION
WD	:	WOUND DEHISCENCE
WC	:	WOUND COLLECTION

URKUND

Urkund Analysis Result

Analysed Document:	buvi geethu.doc (D42304670)
Submitted:	10/9/2018 6:51:00 AM
Submitted By:	buvanamathiyalagan@gmail.com
Significance:	3 %

Sources included in the report:

sakthi thesis.docx (D42128397)
http://europepmc.org/articles/PMC3477405

Instances where selected sources appear:

3

MADURAI MEDICAL COLLEGE
MADURAI, TAMILNADU, INDIA -625 020
(Affiliated to The Tamilnadu Dr.MGR Medical University, Chennai, Tamil Nadu)

ETHICS COMMITTEE CERTIFICATE

Name of the Candidate	:	Dr.Buvana .M
Course	:	PG in MS., General Surgery
Period of Study	:	2016-2019
College	:	MADURAI MEDICAL COLLEGE
Research Topic	:	Comparative study of primary suturing Vs v-y advancement flap technique in resurfacing post excisional defect in cases with pilonidal sinus disease in GRH, Madurai
Ethical Committee as on	:	10.07.2018

The Ethics Committee, Madurai Medical College has decided to inform that your Research proposal is accepted.

Member Secretary Chairman Dean / Convenor

Prof Dr V Nagaraajan
M.D., MNAMS, D.M., Dsc.,(Neuro), Dsc (Hons)
CHAIRMAN
IEC - Madurai Medical College
Madurai

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